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Forest Service

Kelly Bar Habitat Enhancement Project Environmental Assessment

Salmon/Scott River Ranger District, Klamath National Forest, Siskiyou County, California

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Cover Image: Drone image of Kelly Bar and West Bar on the North Fork Salmon River (M. Love 2016)

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Introduction

The Salmon River Restoration Council (SRRC), in coordination with the Forest Service, proposes to enhance off-channel fisheries and riparian habitat on Kelly Bar at the mouth of Kelly Gulch and West Bar (across the river) on the North Fork Salmon River on the Salmon/Scott River Ranger District of the Klamath National Forest. The project is within the North Fork Salmon River watershed, two miles downriver of Sawyers Bar, California, in Siskiyou County. The project is within the Shiltos Creek-North Fork Salmon 7th field hydrologic unit (HUC 18010210020706). The legal description of the location is Township (T) 40 North (N), Range (R) 12 West (W), Section 24 (Mt. Diablo Meridian). The entire project area is located on Klamath National Forest lands. See Appendix A for vicinity and site maps.

We prepared this environmental assessment (EA) to determine whether implementation of stream restoration may significantly affect the quality of the human environment and thereby require the preparation of an environmental impact statement. By preparing this EA, we are fulfilling agency policy and direction to comply with the National Environmental Policy Act (NEPA). For more details of the proposed action, see the Proposed Action and Alternatives section of this document.

Background

The Salmon River is one of the most biologically intact subbasins of the Klamath River. The Salmon River hosts all the native anadromous fish runs present in the Klamath River Basin, including the state and federally listed Southern Oregon-Northern California Coast (SONCC) Ecological Significant Unit population of coho salmon. This almost ½ million acre watershed is 98% publicly owned and many segments of the river are designated as Wild and Scenic. The large proportion of federal land and the comparatively high quality water and habitat conditions make the Salmon River one of the best candidates for succeeding in restoring anadromous fisheries in the Klamath River Basin. Wild runs of coho salmon still persist in the relatively unimpaired waters of the Salmon River, yet they face a high risk of extinction. Little is known about historic run sizes of coho salmon in the Salmon River; however, the National Marine Fisheries Service's Intrinsic Potential model suggests it has a moderate carrying capacity for coho salmon. The Salmon River likely supported a population of a few thousand coho salmon in the past. That number has dropped precipitously in the last two decades, and presently adult returns are likely less than 50 per year (NMFS, 2014). Problems facing coho salmon and other fish on the Salmon River include invasive species, barriers to fish passage, depleted large woody debris, high sediment loads, large wildfires, limited riparian function, unstable spawning gravels, and temperature impairment.

Despite its high habitat and water quality, the fishery of the Salmon River is a remnant of what it once was. Starting in the 1850s land use changes in the Salmon River, such as large scale hydraulic mining and timber harvest, began to alter river channels and riparian areas. Between 1870 and 1950 it is estimated that over 15 million cubic yards of sediment was discharged into the Salmon River as a result of gold mining. Mining impacted the landscape, vegetation, soil, water quality, and channel structure in many fish-bearing streams. Extensive logging occurred from the 1950s - 1980s, the most significant outcomes of these logging activities have been the associated changes in the natural fire regime, the substantial building of road networks throughout the basin, and loss of large diameter wood structures in streams.

Coho life histories are comprised of a chain of habitats with a favorable spatial and temporal distribution. In the Salmon River, the linkages between these habitats have largely been broken. Due to a combination of factors, including simplification and fragmentation of habitat, coho populations are declining. According to the Final SONCC Coho Recovery Plan the highest priority for recovery in the Salmon River should be improving the quality and extent of rearing habitat and refugia (NMFS, 2014). For summertime rearing, the priority should be reducing water temperatures, along with protecting and restoring thermal refugia. For winter rearing, the priority

should be improving connectivity to existing off-channel habitat, and increasing the extent and quality of winter rearing habitat. Therefore, such habitat should be restored or recreated wherever possible.

Kelly Bar and West Bar (across the river) are located within a reach of the North Fork Salmon River that is potentially a key coho salmon spawning reach on a river with limited potential for this species, which is listed as Threatened by both the State and Federal Endangered Species Act. The low gradient of this reach of the river makes it preferred habitat for coho salmon; for both spawning and rearing.

The North Fork Salmon River has degraded habitat complexity as a result of historic unrestricted stream clearing, logging, and mining. Logging that occurred from the 1950s - 1980s resulted in the removal of most of the large conifers from the creeks resulting in a loss of large diameter wood inputs into the river. This has resulted in a broad-scale simplification of channel complexity and a corresponding reduction of suitable habitat for all life stages of salmonids.

Within the project area, much of the alluvial bars have been reworked by historic placer mining and dredging. Kelly Bar and West Bar now, mostly consist of barren, large alluvial floodplain with several sparsely vegetated, discontinuous, remnant high-flow side channels and vegetated alluvial terraces. The high-flow side channels are largely dry throughout the summer and fall, as well as the two ponds on Kelly Bar. These off-channel areas are currently considered marginal habitat for SONCC coho and other salmonids.

The project is located on a river reach that has been given a high priority ranking for riparian restoration (SRRC, 2008). The Final SONCC Coho Recovery Plan (NMFS, 2014) identifies projects like this as high priority actions in the Salmon River watershed (SONCC-SalR.2.1.7). The Recovery Strategy for California Coho Salmon (CDFG, 2004) also identifies projects like this as a high priority action in the Salmon River watershed (SA-HA-09). Additionally, The Kelly Bar Project area was identified as having High Intrinsic Potential for SONCC coho and coho juveniles have been found in at least nine tributaries to the river during Karuk Tribe and SRRC presence/absence surveys, including both above and below the Kelly Bar project area (NMFS, 2014).

The habitat enhancement actions proposed in this project would directly address recommendations from the Recovery Plan, as well as all other salmonids in the watershed (NMFS, 2014), by 1) improving connectivity to and enhancing side channels and creating alcoves on Kelly Bar and West Bar (across the river) and 2) enhancing two off-channel ponds on Kelly Bar.

Purpose and Need

The objective is to enhance off-channel fisheries and riparian habitat on the North Fork Salmon River, creating habitat features necessary for coho and other salmonid recovery in the Salmon River.

This project would address five critical elements of long-term restoration and maintenance of both water quality and fish habitat on the Salmon River: 1) access to slow water habitat where migrating smolts can take refuge from the strong hydraulics of the mainstem, increasing winter rearing habitat for juveniles; 2) access to over-summer rearing habitat through pool development 3) providing low gradient, off-channel spawning habitat; 4) restoring riparian vegetation that provides shade and subsequent cooler water temperatures during warm summer/fall months and future large woody debris recruitment; and 5) restoring large woody debris into barren side channels to provide increased cover and rearing habitat for adult and juvenile salmonids.

The purpose of this project is to increase the abundance of complex off-channel rearing habitat with high intrinsic potential for year-round rearing of juvenile salmonids by providing both high-flow and thermal refugia. Specific project objectives include:

- Create self-sustaining side-channels with off-channel alcoves for high-flow off-channel refugia.
- Provide off-channel high-flow and thermal refugia using groundwater-fed ponds and exploiting hyporheic (i.e., groundwater just under the surface of the floodplain which interacts with surface flows) flows in alcoves.
- Increase in-channel bed complexity using large wood features.
- Create large wood complexity in off-channel habitats.
- Increase riparian shading to reduce summer water temperatures.
- Improve connectivity of Kelly Gulch with river for fish ingress and egress.
- Minimize removal of large riparian vegetation.
- Balance cuts and fills within the boundary of each of the two mining claims within the project area.

Management Direction

The 1995 Klamath National Forest Land and Resource Management Plan (Forest Plan, as amended; Klamath National Forest 1995) includes Standards and Guidelines from the Northwest Forest Plan. The Forest Plan provides forest-wide and management area (MA) direction for project-level activities (see Management Area Map, Appendix A). The project is within the Riparian Reserve MA (MA-10), specific direction for the Riparian Reserve MA can be found on pages 4-126 to 4-127 in the Forest Plan. Additionally, three proposed Special Habitat sites (MA-5, Late Successional Reserve) occur within the project; found in pages 4-82 to 4-94 in the Forest Plan. Enhancing the North Fork Salmon River sidechannels would meet Forest Plan Aquatic Conservation Strategy Objectives by aiding the recovery of fish habitat, riparian habitat, and water quality (6-46; see Appendix C).

Decision Framework

The responsible official for this project is Ted McArthur, District Ranger for the Salmon and Scott River Ranger District, Klamath National Forest. This EA is not a decision document; it discloses the environmental consequences of implementing the action alternative, or taking no action. This EA also aids the responsible official in determining whether the effects disclosed would have a significant effect on the environment. If the responsible official determines there would be no significant effects, he will select the proposed action alternative, issue a “Finding of No Significant Impact”, and sign a Decision Notice.

Within the Decision Notice, the responsible official will determine whether to implement the proposed action or choose no action (Alternative 1) at this time. The final decision will be based on the information in this document, the supplementary information contained in the project record, consideration of any public comments, how well the selected alternative meets the purpose and need for the project, and whether the selected alternative complies with agency policy, applicable state and federal laws, and Forest Plan direction.

Public Involvement

On October 13, 2017, the proposal was mailed to nearby landowners or claim owners, to four tribes, the United States Fish and Wildlife Service, the National Marine Fisheries Service, Siskiyou County, and to the North Coast Regional Water Quality Control Board for a 15-day public scoping period from October 19th, 2017 to November 2th, 2017. The proposal was posted on the Forest website and first listed in the Schedule of Proposed Actions on October 1, 2017. One comment was received during the scoping period by email, the comment was in opposition to the proposed action due to the history of disturbance within the project area, and the history of restoration

projects effectiveness within the Salmon River area (See Appendix E for a response to the scoping comment received). A letter of inquiry from members of the public opposed to restoration actions on the Salmon River was submitted outside of the scoping period, contact has been made with the most interested individuals on this list, and opportunity for follow up comments were provided during the 30-day public comment period on this EA. The proposed action was not specifically identified in the letter of inquiry, rather the letter requested that the individuals be notified of potential future in-stream restoration actions.

On June 26th, 2018, notice of a 30-day public comment period was mailed to nearby landowners or claim owners, interested members of the public, to four tribes, the United States Fish and Wildlife Service, the National Marine Fisheries Service, Siskiyou County, and to the North Coast Regional Water Quality Control Board; the comment period occurred from June 29th, 2018 to July 28th, 2018. Notice was also posted on public notice boards; two locations in Sawyers Bar, the project site, and Forks of Salmon. On July 21, 2018, there was a public field trip to discuss the project and give additional opportunity for public comments and questions. Thirteen individuals attended the field trip, and one verbal public comment was given. During the public comment period a total of fourteen comments were received, including two comments received after the end of the legal comment period. Thirteen comments were supportive of the project and one comment was opposed to the project. See Appendix E for summaries of those comments.

Additionally, this project was discussed in the Salmon River Restoration Council's 2016 fall newsletter, the 2016 Annual Report, the Salmon River In-Stream Restoration Open House, which occurred on November 3, 2017, and in the July 2018 issue of the e-newsletter Salmon River Currents; all of these were accessible to the public. Additional information regarding this proposal and supporting analysis can be found on the project webpage at: <https://www.fs.usda.gov/project/?project=52447>.

Alternatives

Alternative 1 – No Action

Under the No Action alternative, no treatments as proposed would be implemented. The No Action alternative provides reviewers a baseline against which to compare the magnitude of environmental effects of the action and any alternatives.

Alternative 2 - Proposed Action

The Salmon River Restoration Council, in coordination with the Forest Service, proposes to improve the connectivity to side channels, enhance side channels, and create alcoves on Kelly Bar and West Bar (across the river), as well as enhance two off-channel ponds on Kelly Bar. Treatments would include excavation of channels, alcoves, and ponds, constructing engineered log jams and small wood habitat features, diverse riparian planting, and cattle fencing, see Project Area Map (Appendix A). For a detailed description of the analysis used to develop this project refer to the *Kelly Bar Off-Channel Fisheries and Riparian Habitat Enhancement Project – Basis of Design Report* (Michael Love and Associates, 2016).

The proposed action is to construct three fully engineered structures that consist of multiple large diameter (1-foot to 3.5-foot diameter breast height) logs, some with rootwads intact, at the inlets of the side channels on Kelly Bar and West Bar along the North Fork Salmon River. Multiple, smaller structures with large diameter logs (up to three logs each) would be placed along the side channels and within the ponds as fish habitat features. Wood materials would be acquired from off-site sources through purchases and private donations. The side channels would be enhanced by excavation of the channels and alcoves, as well as brush baffles and diverse riparian planting of native vegetation along the channels. The plantings would be protected from desiccation and weed

encroachment using locally sourced mulch made from forest slash. The riparian planting would be protected from cattle browsing by constructing a gated, cattle exclusion fence along Sawyers Bar Road and anchored to impassible locations at the river. Two ponds would be enhanced by excavation on Kelly Bar; Kelly Pond and Willow Pond (see Project Area Map, Appendix A). A boulder weir would be constructed at the outlet of Kelly Pond. All structures would be built and anchored in compliance with Chapter VII of the California Department of Fish and Wildlife (CDFW) Habitat Restoration Manual (Flosi et al., 2010) and through the guidance of the CDFW grant manager for this project. All restoration would be constructed with the guidance of an experienced Professional Engineer (Michael Love and Associate's, Project Engineer), using a tracked excavator, bulldozer, and dump truck on an existing access route. The proposed project does not intend to reconfigure the existing channel of the North Fork Salmon River.

Work would be conducted during low flow conditions, with the minimal equipment necessary to implement the project. Implementation would begin after August 1st, and all work along the stream channel would be completed by October 15th. All site stabilization and erosion controls would be completed by October 23rd, and all manual methods of riparian planting would be completed by November 30th, to allow for optimum planting conditions. Most of the construction would occur out of the side channels, and the ponds would be dry. However, construction at the connection of side channels would require isolation and dewatering from the North Fork Salmon River. Fish exclusion screens and fish removal by a qualified biologist would be implemented in all such areas. Prior to working at individual features within the project footprint, an individual would precede the equipment on foot to displace fish and wildlife and prevent them from being injured. Any fish or wildlife in the work area shall be flushed in a safe direction away from the project site. Temporary crossings would be placed over the North Fork Salmon River (temporary bridge) and Kelly Gulch (temporary culvert); ground disturbance related to placement of the crossings would be minimal (see Project Area Map, Appendix A). No trees would be removed along the North Fork Salmon River or Kelly Gulch for equipment access or operation, therefore there would be no canopy shade loss over the North Fork Salmon River or Kelly Gulch. The incremental area of vegetated riparian disturbance is about 0.25 acres; primarily Himalayan blackberry (*Rubus armeniacus*) which does not provide meaningful shade to Kelly Gulch or the North Fork Salmon River. The riverbanks would be minimally disturbed as a result of construction; the total soil disturbance for the project is about four acres. However, such disturbance would occur within the annual floodplain; areas annually disturbed by high flows. Areas of soil compaction not within the existing access route would be de-compacted, if necessary, following construction using a tracked excavator with a ripper attachment.

The mine tailings upriver of Willow Pond are currently outside of the area proposed for ground disturbing activities. However, exclusionary flagging would be placed to indicate that heavy equipment should not enter the area of tailings, nor should project spoilage materials be placed in the area.

Invasive Himalayan blackberry occurs throughout the project area. Treatment of this species during construction would include clearing, grubbing, and burning vegetative material. Excavated soil containing propagules (plant materials that can regrow new plants) would be buried deeply in spoil locations. Long-term treatment for native riparian vegetation establishment includes clearing, grubbing, and burning Himalayan blackberry and other non-native vegetation as necessary.

There are two mining claims occurring within the project area. Therefore, the balance of the cuts and fills would remain on the mining claim from which they originated. The claim owners were contacted during the design, scoping, and public comment phases of this project.

Additionally, monitoring and reporting would occur annually each year for three years following construction of the project. The report would summarize monitoring activities, findings, and recommendations. The annual report would also identify any issues that may warrant maintenance or other types of treatment. In the event that items of concern arise, the report would recommend actions to be initiated to further characterize its

impact on project objectives and/or consultation with the project team members and/or other agencies, to determine if a maintenance action is warranted. All monitoring and reporting would be conducted by SRRC, which would include evaluations of photo monitoring, structure/site stability, erosion controls, water quality, revegetation success, and invasive species. Restoration effectiveness would be evaluated through pre- and post-monitoring including changes to fish habitat (winter and summer refugia, temperature, and dissolved oxygen), fish observations (primarily salmonids), avian observations (primarily neotropical migratory species), natural vegetative recruitment, revegetation success, and non-native invasive species (priority noxious weeds and bullfrogs).

The project is covered under the programmatic US Army Corps of Engineers Clean Water Act section 404 Regional General Permit 12, which includes Section 7 consultation for the Endangered Species Act. A Water Quality Certification (Clean Water Act section 401) is in progress and a Construction General Permit Waiver has been received from the State Water Resources Control Board. Project implementation will not be initiated until all required permits have been completed. California Environmental Quality Act review has been completed for this project. A Section 1600 Streambed Alteration Agreement with California Department of Fish and Wildlife is in progress; though it is not required on federally managed lands, it is required by the funding agency.

Project Design Features

Table 1. Project Design Features incorporated into Alternative 2.

Design Feature	Description
AIR-1	Dust control measures will be implemented to minimize dust generation and effects to visibility to drivers on the Forest Road.
Aquatics-1	The two enhanced ponds will be monitored for the life of the ponds, if water quality is determined to be detrimental to salmonid health (e.g., temperature of dissolved oxygen), they will be re-evaluated and altered to provide seasonal high flow refugia for salmonids.
ARCH-1	All sites within the area of potential effects will be clearly identified prior to implementation. This includes but is not limited to flagging site boundaries.
ARCH-2	Any project activities within site boundaries will adhere to Standard Resource Protection Measures as approved by the Forest Heritage Program Manager and documented in the Archaeological Survey Report.
ARCH-3	If any late discoveries of human remains or sites not previously recorded are identified during project implementation, work in the immediate area will stop and the District Archaeologist and Heritage Program Manager will be contacted.
WL-1	To avoid disturbance to potentially breeding northern spotted owl, in or near the project area, project activities that involve louder than ambient noise levels will be prohibited from February 1 st - July 9 th each year. This is in conformance with CDFW's restriction for northern spotted owl, other raptors, and migratory birds. However, a more restrictive time frame will be implemented to avoid impacts to other potentially nesting birds within riparian habitat. Ground disturbing activities and those resulting in noise significantly higher than ambient levels will be restricted until August 1 st .

Design Feature	Description
WL-2	Prior to working at individual features within the project footprint, an individual will precede the equipment on foot to displace fish and wildlife and prevent them from being injured. Any fish or wildlife in the work area shall be flushed in a safe direction away from the project site.
WL-3	Due to concern regarding the possibility for the ponds on site to create habitat for invasive American bullfrogs (<i>Lithobates catesbeianus</i>), monitoring for presence of the species will occur monthly for 3 years following implementation of the project. Monitoring will continue for another 2 years several times per year following implementation for a total of 5 years of post-implementation monitoring, at which point the need for continued monitoring will be assessed. If bullfrogs are observed the ponds will be re-evaluated to determine the appropriate action.
WS -1	<p>For activities that occur within Riparian Reserves, the Normal Operating Season (NOS) will be June 1st to November 15th. Ground disturbing activities will also be restricted during periods of wet weather during the NOS. See BMP 1.5 (Appendix B).</p> <p>However, the more restrictive CDFW NOS of “June 15th to November 1st, or the first significant rainfall, whichever comes first”, will be applied to this project.</p> <p>Additionally, the State Water Resources Control Board Construction General Permit Waiver requires that all site stabilization and erosion controls be completed by October 23rd.</p>
WS-2	Mulch and/or seed areas disturbed by restoration activities where sufficient levels of soil cover are lacking.
WS-3	<p>Erosion control and other requirements to protect water quality are described in BMPs (Appendix B).</p> <p>If “conditions arise or change in such a manner as to be considered deleterious to aquatic life, operations shall cease until corrective measures are taken” by CDFW.</p>

Design Feature	Description
WS-4	<p>The designated project drafting site is within a Pacific salmonid-bearing stream reach. Therefore, <i>NOAA Fisheries Water Drafting Specifications</i> guidelines will be used. They include, but are not limited to, the following:</p> <ol style="list-style-type: none"> 1. When in habitat potentially occupied by Chinook and Coho salmon, intakes will be screened with 3/32-inch mesh for rounded or square openings, or 1/16-inch mesh for slotted openings. When in habitat potentially occupied by steelhead trout, intakes will be screened with 1/8-inch mesh size. Wetted surface area of the screen or fish-exclusion device shall be proportional to the pump rate to ensure that water velocity at the screen surface does not exceed 0.33 feet/second. <ol style="list-style-type: none"> a. Use of a NOAA approved fish screen will ensure the above specifications are met. 2. Fish screen will be placed parallel to flow. 3. Pumping rate will not exceed 350 gallons-per-minute (gpm) or 10% of the flow of the anadromous stream drafted from. 4. Pumping will be terminated when tank is full. <p>For any water drafting that occurs in non-fish bearing waters, Forest Service BMP 2.5 defines restrictions (Appendix B).</p> <p>All water drafting will avoid having any effect on the amount of cold water in thermal refugia at creek mouths and seeps.</p>
WEED-1	Equipment will be washed to prevent the spread of invasive species, appropriate equipment cleaning procedures will occur prior to moving to the project area, and after leaving the project area.
WEED-2	Wherever seed and/or straw is used to restore areas of ground disturbance, certified weed free seed and straw will be specified in the contract and used during implementation and any follow up treatments. Only native species will be used for seeding areas of disturbance.
WEED-3	Priority noxious weed infestations will be flagged on the ground prior to project implementation. Known infestations of priority noxious weeds will be treated by either manual or mechanical methods prior to seed set to avoid transporting seeds from the infested locations to other portions of the project area.
WEED-4	The project area will be monitored annually for priority noxious weed infestations for five years following implementation, at which point the need for continued monitoring will be assessed. If priority noxious weeds are observed they will be treated by manual or mechanical methods prior to seed set.

Alternatives Considered but Eliminated from Detailed Study

The following alternatives were considered during the design process for this project, but were not further analyzed or developed (Michael Love and Associates, 2016).

Perennial Side Channels

Perennial side channels were not considered due to the channel depth necessary to reach the perennial groundwater elevation, and the possibility of river avulsion (channel movement) associated with such a deep side channel feature.

Separate Side Channels on Kelly Bar

Two separate side channels each with their own alcoves were considered on Kelly Bar. Though this alternative would provide two alcoves that could be used for both summer and winter rearing habitat, the downstream alcove is located on a steep riffle. Fish access to the downstream alcove would be difficult for juvenile salmonids during high flow velocities.

Kelly Gulch Channel Realignment

Realigning Kelly Gulch into a single threaded channel with an alcove at the confluence at the river was considered. The alcove for this alternative is located on a steep riffle where the fish access may be difficult due to higher water velocities. Additionally, a moderate amount of riparian area would need to be cleared for this alternative. The design team agreed that as it is, the flows from Kelly Gulch provides an important cold water resource to the margins of the river, and channelizing Kelly Gulch would be detrimental to this habitat and was not desirable. Additionally, the long-term stability of the realigned channel and alcove is doubtful.

Back Bar Channel Alcove on West Bar

Excavating an alcove on the Back Bar Channel on the West Bar was considered. There is bedrock present where the alcove would be located, and therefore, it would not be cost-effective to excavate an alcove at that location. Additionally, a riffle has formed in the alcove location that could cause sedimentation in the outlet. Even with increased flow frequencies through the Back Bar Channel, there is some uncertainty if flows would be sufficient to maintain an open alcove. Additionally, this site is also the most difficult to access and would result in some impacts to exiting riparian area for access. The design team did select a feature of this alternative for further development, a large wood structure is planned to be installed at the upstream end of the channel to increase the flow frequency into the side channel. This is a low cost and low impact approach selected to improve the side channel for winter rearing habitat. No alcove would be constructed.

Increasing Flow to the Back Channel on Kelly Bar

Consideration was given to increasing flows to the Back Channel (abandoned 1955 channel) on Kelly Bar. The channel follows the toe of the Sawyers Bar Road embankment. Observations of flows in this area during the monitoring period indicated that this channel begins to receive small amounts of inflow during an approximately 2-year flow event. Increasing flows to this channel could create an additional area of off-channel high-flow velocity refugia for salmonids. There is a concern that higher and more frequent flows within this area could compromise the integrity of the roadway embankment and also potentially cause a channel avulsion. Therefore, this alternative was eliminated from further analysis.

Removal of the Mine Tailing Piles on Kelly Bar

Removal of the mine tailing piles on Kelly Bar upstream of the Willow Pond was considered to improve floodplain function. However, the largest riparian trees within the entire reach are growing on the tailing piles, so removal was considered counter to the objective of increasing riparian cover along the river. Examination of the aerial photographs and geomorphic mapping and dimensional modeling results for the 10-, 25-, 50-, and 100-year flow events indicate that the mine tailing piles present only a minor obstruction to the cross-sectional flow of the river. The tailing piles are located at the downstream end of a long and high “perched bar” that appears to be a combination of the remnants of the pre-1955 landslide and aggradation (channel filling with sediment) that occurred during the 1964 flood event. The perched bar itself has a greater effect than the tailing piles in separating river and floodplain flow, directing floodplain flows into the Back Channel along Sawyers Bar Road. The design team was in broad support of leaving the tailing piles undisturbed to protect the existing riparian trees that are established within them. These trees shade the river and would also provide shade to the new Willow Pond (proposed within Alternative 2 above). Additionally, as part of this review process the tailings were identified as potentially significant Heritage Resources and would be completely avoided during construction.

Environmental Impacts of the Proposed Action and Alternatives

This section summarizes the biological, physical, and cultural environments of the affected project area and the potential changes to those environments due to project implementation. It also presents the scientific and analytical basis for comparison of alternatives presented. All specialist reports evaluated the entire project proposal.

This EA incorporates the Klamath National Forest Plan by reference and tiers to the Final Environmental Impact Statement (USFS, 1994). The discussions of resource potential effects take advantage of existing information included in the Forest Plan and other sources as indicated. Where applicable, such information is briefly summarized and referenced to minimize duplication. The planning record includes all project-specific information such as resource reports, ecosystem analyses, and other results of field investigations.

The supporting resource specialist reports and their amendments are available on the project website at: <https://www.fs.usda.gov/project/?project=52447>. Key points from the analysis documents are summarized in this section and the documents, including resource reports, are incorporated by reference.

Water Quality

Methodology

Analysis Indicators and Measures

- Potential of increased temperature loading to the Salmon River. The potential for increased stream temperature is approximated by the length (linear feet) of stream channel and subsequent riparian vegetation disturbed by the project placed into context at the watershed scale. The North Coast Regional Water Quality Control Board and US Environmental Protection Agency have listed the Salmon River as impaired due to elevated water temperatures. The Salmon River Total Maximum Daily Load (TMDL) and Implementation Plan was prepared to reduce the temperature issues in the watershed over the long-term (NCRWQCB, 2005). The Plan uses shade from riparian vegetation as a surrogate measure for stream temperature.
- Likelihood of increased sediment loading to the Salmon River. The potential for increasing sedimentation is approximated by the area (acres) of soil disturbance at the project site. The risk likelihood for sediment is based on the Equivalent Roaded Area model, which translates management actions to acres of impact and developed thresholds of concern for impacts at the watershed scale. The range of impacts below in Table 2 is based on the levels of impact in relation to the thresholds of concern and in this case, can put potential sediment loading into perspective.

Table 2. Range of risk relating to Equivalent Roaded Area (ERA) acres

Range of ERA acres*	Risk Likelihood
Up to 3 acres	Low Risk; 1% of the Threshold of Concern (TOC) acreage
3 to 31 acres	Moderate Risk; 10% of the TOC acreage
31 to 311 acres	High Risk; 100% of the TOC acreage

*The range of acres at risk are based on the modeled TOC for the 7th field watershed in which the project occurs. For this project, the TOC is 371.45 acres. There are currently 60.2 acres of disturbance within the watershed, therefore a disturbance of 311 acres would result in reaching the TOC acreage within the watershed. A moderate risk likelihood is calculated as 10% of the disturbance of high risk acreage and a low risk likelihood is calculated as 1% of the disturbance of high risk acreage.

- Changes to fluvial geomorphic condition within the project area, including river channel and side channel stability, side channel and floodplain inundation, off-channel habitat complexity, river bar grainsize, large woody debris, and riparian vegetation.
- Changes to water temperature and dissolved oxygen (DO) within proposed constructed ponds. The measure for this indicator is river flow and water quality monitoring data in relation to water quality in the North Fork Salmon River, these changes are discussed in order to inform potential affects to fisheries resources.

Spatial and Temporal Bounding of Analysis Area

The spatial bound for this analysis is the Shiltos Creek-North Fork Salmon 7th field hydrologic unit (HUC 18010210020706). This boundary is appropriate for assessing the project impacts as they might be experienced by an aquatic organism at the confluence with the Salmon River.

The short-term temporal bound for the analysis is 2 years and is based on the assumption that an overbank flow event has a high likelihood of occurring within 2 years of project implementation. The long-term temporal bound for the project is 10 years because it is expected that any potential reductions to stream shade (and indirect and cumulative adverse effects to water temperature) from project activities would recover within 10 years, if not more quickly.

Affected Environment

The project area is in an alluvial valley at the base of steeply sloping, forested, drainages of eroding metamorphic and granitic geology. The project area encompasses about 12 acres, and includes (1) the confluence of perennial Kelly Gulch with the North Fork Salmon River, (2) Kelly Bar; a wide overbank bar complex on river right upstream of the Kelly Gulch confluence; and (3) West Bar; a bar complex on river left across from the Kelly Gulch confluence. The bars have been reworked by historic placer mining and dredging and now mostly consist of simplified, barren, large alluvial floodplain (comprised of sand, gravel, and cobble), with several sparsely vegetated, discontinuous, remnant high-flow side channels, and vegetated alluvial terraces. The high-flow side channels are largely dry throughout the summer and fall, as are two ponds on Kelly Bar. The side channels lack complex habitat including large woody debris and riparian vegetation, and therefore, the area has been identified as a high priority for riparian restoration (SRRC, 2008).

The Salmon River hydrologic area (as defined by the North Coast Regional Water Quality Control Board), which includes the North Fork, is registered on the Clean Water Act 303(d) list as impaired for temperature, as part of the Klamath Hydrologic Unit listing (NCRWQCB, 2005). As part of the listing, the 2005 Salmon River Total Maximum Daily Load (TMDL) for Temperature and Implementation Plan adopted a temperature “loading capacity” limit for the river (NCRWQCB, 2005). The threshold of no more than 5°F rise in the temperature of cold water above natural receiving water temperatures applies to the river within the project area, including the confluence of Kelly Gulch and the North Fork Salmon River.

For this project, water temperatures were continuously monitored in the river and Kelly Bar for one year prior to design, between October 2014 and September 2015. During the monitoring period, peak river water temperatures exceeded 19°C beginning in late May, and rose above 22°C by mid-June, in September river temperatures fell below 19°C. Generally, groundwater temperatures along Kelly Bar remained lower than river temperatures in the summer months, but remained warmer than the river as it cooled in the fall. Given that river flows were extremely low during the latter part of the monitoring period, both river and groundwater summer temperatures would likely be lower during more typical water years.

Eleven discrete water temperature and dissolved oxygen measurements were also collected between November 2014 and July 2015. Dissolved oxygen in the groundwater readings were lower than dissolved oxygen in the river

and Kelly Gulch. Dissolved oxygen levels across the six groundwater wells remained near 5 mg/l or higher except for the well located near the proposed Willow Pond where dissolved oxygen concentrations of 0.3 mg/l were recorded August 2015, this was the lowest value recorded (see Table 3). During the water quality monitoring period, monthly mean flows in the North Fork Salmon River were above average compared to historical data during fall and winter months (Oct. – Feb. 2014, except for January). However, they were well below average during early spring and summer months (Mar. – Aug. 2015). In 2015 during the focus period for fish and when dissolved oxygen measurements in Willow Pond were below 5 mg/l, the river was 35% of normal in April, 22% of normal in May, 23% of normal in June, and 39% of normal in July. The water year during the timeframe of this monitoring effort was 74% of normal. Given the low dissolved oxygen measurements in Willow Pond, additional monitoring of the feature was initiated beginning in April 2018 (see Table 3). To date, the current water year has been 73% of normal.

Table 3. Water temperature and dissolved oxygen (DO) measurements in Willow Pond.

Month & Year	Temp. (°C)	DO (mg/L)
October 9, 2014	17.2	4.24
February 6, 2015	8	11.2
April 26, 2015	10.8	2.98
May 28, 2015	12.5	3
June 22, 2015	15.6	2.61
July 29, 2015	19.1	0.7
August 11, 2016	17.1	0.3
September 14, 2016	17.8	4.20
April 19, 2018	6.2	5.3
April 26, 2018	6.6	7.4
May 6, 2018	6.8	7.11
May 18, 2018	8.2	6.13
May 21, 2018	8.3	5.32
June 10, 2018	10.5	4.37
July 3, 2018	12.9	2.59
July 30, 2018	16.5	1.47

Additional measurements were taken of the surface water at Willow Pond on April 26, 2018, which was generally 3-4" deep at the time of measurement. In the shade, the dissolved oxygen measured 13.5 mg/l and the temperature was 10.3°C, while the same water in the sunlight was measured at 12.1 mg/l for DO and 20.6°C. The comparatively low dissolved oxygen measurement in the groundwater on that date shows the effect of surface air mixing on dissolved oxygen concentrations as the water is exposed to the air (Greig et al., 2007 and Wilson, 2010).

The effects of surface air mixing increasing dissolved oxygen concentrations in exposed groundwater has also been observed when sampling water quality along the Red Bank river bar in 2016, just down river of the Kelly Bar project area. The hyporheic flow consistently showed lower dissolved oxygen in groundwater wells, but increased with air exposure as it emerged into the adjacent side channel.

The 1964 flood shifted the river channel alignment to the west, placing it at the toe of the river valley, where it has remained since. As the river has cut down through its current channel the river bars have become perched above the river, resulting in high vertical banks adjacent to the river, which limit the river's access to the floodplain. The active channel of the river and bar systems have the potential to shift substantially during extreme flow events (i.e., greater than 50-year return intervals), but would likely undergo only smaller shifts in the channel as it responds to moderate flow events, as has occurred since 1964.

The modeling results (Michael Love and Associates, 2016) indicate that flows remain within the main channel of the river until approximately a 1.1-year flow event, where flows begin to expand onto the river bars. The overflow channel on Kelly Bar becomes active at about a 2.2- year event. The mid-bar channel on West Bar becomes active at about a 1.1-year event. The back-bar Channel on West Bar begins to receive a small amount of flow during a 2.2-year event. Neither Kelly Bar nor West Bar become fully inundated, with water spreading from valley wall to valley wall, until greater than 10-year events occur.

Kelly Gulch flows onto Kelly Bar as a steeply sloping single-thread channel and delivers a sediment load of sands and small gravels to the bar. Downstream of the Sawyers Bar Road bridge, sediment deposition causes the channel to split into multiple, less defined threads. During the summer, flows often become subsurface, eliminating a direct connection to the river, then emerge again at the river bank. Along an approximate 100-foot length of river, shallow margin flows in the river are substantially cooler due to inflow from Kelly Gulch. One of the multiple channels forming Kelly Gulch creates a perennial surface flow source to Kelly Pond, a depression in the floodplain that was created as a hunting pond and has since mostly filled in. The pond also receives flow from an excavated ditch connection between the back-channel adjacent to Sawyers Bar Road, beginning with about 2-year events. Willow Pond, currently a shallow depression at the upper end of Kelly Bar, also begins to receive flows from the back-channel at about 2-year events.

For a detailed description of the affected environment (including annual precipitation, peak flows, flow analysis, water quality, and hydraulic analysis) refer to the *Kelly Bar Off-Channel Fisheries and Riparian Habitat Enhancement Project – Basis of Design Report* (Michael Love and Associates, 2016).

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

If the No Action alternative is selected, there would be no soil or vegetation disturbance by this project within the 7th field analysis watershed. However, currently, both Kelly Bar and West Bar have degraded riparian habitat and water quality.

The No Action Alternative would continue to directly and adversely affect water quality by maintaining poorly developed side channels which lack complex habitat, including large woody debris. The river would continue to flush water, sediment, organic material, and racking wood too quickly through the project area. The perched side channels and lack of large woody debris has resulted in simplified off-channel habitat and limits the rivers connection the floodplain. This lack of floodplain inundation and hyporheic flow limits shade creating riparian vegetation, which raises water temperatures. Additionally, the lack of fine sediment and organic material further limits locations of natural vegetation recruitment. There are no beneficial direct or indirect effects from this alternative.

Cumulative Effects

The effects of mining activity within the watershed is minimal and limited to small surface disturbances. The timber harvest, fuels reduction, and culvert replacement projects have a small project footprint relative to the 7th field watershed. None of these activities is expected to affect instream flows, including stream temperature, sediment, channel stability, or groundwater systems within the project area or the 7th field watershed. Therefore, the current condition of the channel in relation to the ongoing activities within the watershed would not combine to result in adverse cumulative effects.

Alternative 2

Direct Effects and Indirect Effects

Based on the results of geomorphological assessment, and hydraulic analysis, the project would enhance existing slow water side channels, create self-maintaining alcoves at the downstream ends of the side channels, and convert two seasonal ponds to cool water perennial ponds. Those features would be further enhanced by the installation of large wood features which would facilitate geomorphic processes and create side channel habitat. Additionally, diverse riparian planting would result in increased shade, direct flows to enhance side channel stability, capture fine sediment for further vegetation recruitment, and result in future large woody debris. The combination of which would greatly increase river access to the floodplain and increase off-channel habitat complexity within the project area.

During project design, it was determined that the extreme low flows during summer 2015 contributed to low summer dissolved oxygen and water temperature throughout the project area. Though dissolved oxygen and temperature were poor to marginal in Willow Pond and somewhat better in Kelly Pond, it is expected that more normal flow conditions and air surface mixing (Greig et al., 2007 and Wilson, 2010) would result in increased dissolved oxygen levels in the enhanced ponds as compared to the monitoring period for the project. Additionally, dissolved oxygen may also increase as planted riparian vegetation matures, which would decrease water temperatures in the ponds allowing the water to hold more dissolved oxygen and the plant roots would leak oxygen into the water (Brix, 1997 and Sand-Jensen et al., 1982).

It is very unlikely the project would result in changes to the existing channel of the North Fork Salmon River. Because the side channels were created during extreme flow events, only extreme flow events can reshape them, which has resulted in the side channels persisting since 1964. Therefore, making small adjustments to the river and its floodplain to improve habitat complexity on the river bars is expected to persist for a long period of time and not alter the main river channel. The enhancements to the side channels are intended to increase the magnitude and frequency of flows into those channels, but are expected to remain stable because optimum flow inlet (40°) and outlet angles (20°) and flow rates (10-20%) were used to design the enhancements and the channels would be further stabilized by riparian planting. On Kelly Bar the overflow channel would become active at about 1.2-year events, rather than the current 2.2 year events. On West Bar the mid-bar channel would be activated annually, rather than during 1.1 year events, and water levels would be raised locally at the back-bar channel inlet. The channels would be self-maintaining, since they would receive flows frequently enough to scour out fine sediments from the channels and alcoves. Engineered log jams would protect the inlets from scour, limit the amount of flow entering the side channels, and reduce the possibility of river channel alignment shifts. Small wood structures would direct flows within the side channels, creating localized scour pools for energy dissipation and gravel sorting, and would rack additional woody material, further increasing the habitat diversity of the project area.

Kelly Pond and Willow Pond would be maintained by cooler groundwater to a depth of 3 to 4 feet. The ponds would have seasonal channel outlets, disconnecting the ponds from surface flows slowly as they subside. Since Willow Pond would likely have low DO concentrations by late June (depending on the water year) resulting in fish avoidance of the pond (Carter, 2005 and Henning et al., 2006), the pond was designed to slowly disengage in July and August, allowing fish to avoid low DO levels. In the event that pond water quality does not meet desired summer conditions, they would be altered to become seasonal ponds. To avoid affecting the geomorphology and hydrology of Kelly Gulch, the outfall channel of Kelly Pond would be separated from Kelly Gulch. Boulder weirs, similar to natural river bar conditions, would be used to provide profile control in the outfall channel.

Most of the construction would occur out of the river channel, when the side channels and ponds are dry. However, enhancement of the alcoves would require isolation of the alcoves from the river channel. Water from the isolation operations would be pumped to a flat area away from the work area and allowed to infiltrate into the

ground. Construction would require that equipment cross the river to access West Bar using a temporary bridge. The location of the temporary bridge is on a stable, rocky, shallow riffle and would result in limited channel disturbance. Abutments would be constructed of materials on-site from existing spoils locations. The bridge would be placed on the riverbank and out of the channel. Turbidity controls during placement would not be applied since velocities would make them ineffective. Equipment would cross in the wet several times in order to place the bridge. Once placed, all crossings would be dry. Turbidity as a result of the wet crossings and abutment placement would be very localized and short-term. Standard BMPs would be applied to placement activities. If river velocities allow, a boom would be placed downstream of the equipment during the first crossing. A temporary culvert would be placed at the equipment access crossing Kelly Gulch, which would have low to no flow during the work window.

Within the short-term (2 years) timeframe, the proposed action has the potential to increase sediment loads within the North Fork Salmon River. Where soil and vegetation are disturbed by construction activities water is more likely to erode and deliver sediment, which is currently stored in terrace and floodplain deposits, to the river increasing turbidity. No colluvial, non-riverine sediments would be at risk of being discharged to the North Fork Salmon River. However, the incremental area of ground disturbance for the project is less than 4 acres, a range with a moderate risk of increased sediment within the river system. Much of the disturbed area is comprised of gravels and cobbles which are resistant to erosion, especially considering that they lie on a floodplain, which is a depositional feature under all but extreme storm events. Though the project area lacks fine sediment, any eroded fine sediment would increase turbidity in the streams. The initial suspended sediment release is expected to be short-term, with the amount of suspended sediment rapidly dropping to pre-construction levels both in time and space (Sear et al., 1998; Madej 2001; Brown, 2002; Foltz and Yanosek, 2005). Most erosion would occur in the few precipitation events following construction, with long-term stabilization occurring once vegetation establishes (Sear et al., 1998; Madej, 2001). These short-term impacts would be reduced by working during dry conditions and placing erosion controls prior to, during, and after construction.

The river banks would be minimally disturbed as a result of construction; most disturbance would occur within poorly vegetated side channels well away from the main channel, resulting in about 1,850 linear feet total disturbance. Within the long-term (10 years), the proposed action has the potential to adversely affect stream temperature through a reduction of shade from riparian vegetation where construction work removes canopy cover. However, the incremental area of vegetated riparian disturbance is about 0.25 acres; primarily Himalayan blackberry which does not provide meaningful shade. The potential long-term impacts can be expected to last no more than 10 years because the proposed project includes riparian planting along barren side channels and poorly vegetated ponds which would create about 1 acre of diverse riparian vegetation. To minimize vegetation removal the alignment of each side channel generally followed the alignment of the existing high-flow channel. Impacts to established native vegetation were avoided as much as possible and no trees would be removed along the North Fork Salmon River or Kelly Gulch.

The enhanced off-channel complexity would increase slow water habitat by creating roughness in the system, which would decrease stream velocity. Slowing stream velocity would improve subsurface groundwater retention within the floodplain, increasing the amount and residence time of hyporheic flow, which would enhance riparian vegetation and result in increased shade (Poole and Berman, 2001; Sawyer and Cardenas, 2012). Reduced stream velocity in flood events would also facilitate deposition of sediment and more natural floodplain processes. This has a beneficial indirect effect on water temperature within the North Fork Salmon River by maintaining hyporheic flow longer into the water year, providing cool water inputs to the North Fork Salmon River during critical summer months for salmonid rearing, benefiting TMDL implementation goals.

Although temporarily increasing temperature and sediment loads in the short term is possible, the potential effects must be put into perspective. When one considers the area of disturbance in comparison to the 7th field watershed area, it is clear the overall potential effects on stream temperature and sediment regime should be very small

(insignificant), if not imperceptible, within the short-term and absent during the long-term. The disturbance is expected to be about 4 acres (0.10% of the 7th field watershed).

For a detailed description of the analysis used to develop this project refer to the *Kelly Bar Off-Channel Fisheries and Riparian Habitat Enhancement Project – Basis of Design Report* (Michael Love and Associates, 2016).

Cumulative Effects

The effects of mining activity within the watershed is minimal and limited to small surface disturbances. The timber harvest, fuels reduction, and culvert replacement projects have a small project footprint relative to the 7th field watershed. These activities are not expected to affect instream flows, including stream temperature, sediment, or geomorphology, within the project area or the 7th field watershed.

Therefore, the addition of this project to the ongoing activities within the watershed (mining, timber harvest, and fuels reduction) would not combine to result in adverse cumulative effects. Therefore, restoration activities would not produce adverse cumulative effects to water quality due to the small size for the project and specified Project Design Features and Best Management Practices which would mitigate potential impacts of the project.

Compliance with law, regulation, policy, and the Forest Plan

The Klamath LRMP Record of Decision (ROD) is the guiding document for all Forest projects. The Klamath LRMP includes reference to the Aquatic Conservation Strategy (ACS), which incorporates specific standards and guidelines for riparian reserves set within the overarching Northwest Forest Plan (ROD to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl) (USFS, 1994). All projects within Riparian Reserves on the Klamath National Forest must therefore be consistent with the objectives, standards, and guidelines of the ACS. The project is located in the Riparian Reserve Management Area (MA-10). Forest-wide standards and guidelines include direction to maintain and restore water quality necessary to support healthy riparian, aquatic and wetland ecosystems. These include, but are not exclusive to, standards and guidelines: 9-1, 9-4, MA10-13, MA10-17, MA10-18, MA10-19, MA10-20. The project is consistent with the LRMP standards and guidelines, including the ACS objectives (for details please see the Forest Plan Consistency Checklist within the project record and Appendix C for ACS compliance).

The North Coast Regional Water Quality Control Board and US Environmental Protection Agency have listed the Salmon River as impaired due to elevated water temperatures. The Salmon River Temperature Total Maximum Daily Load (TMDL) and Implementation Plan was prepared to reduce the temperature issues in the watershed over the long-term (NCRWQCB, 2005). By enhancing riparian vegetative shading and increasing hyporheic flow, this project would cool flows into the North Fork Salmon River, benefiting both anadromous fisheries recovery and TMDL implementation goals.

The project is covered under the programmatic US Army Corps of Engineers Clean Water Act section 404 Regional General Permit 12. A Water Quality Certification (Clean Water Act section 401) is in progress and a Construction General Permit Waiver has been received from the State Water Resources Control Board. A Section 1600 Streambed Alteration Agreement with California Department of Fish and Wildlife is in progress; though it is not required on federally managed lands, it is required by the funding agency.

Fisheries

Introduction

The effects of actions regarding coho salmon, coho Critical Habitat and coho and Chinook Essential Fish Habitat are covered under the programmatic U.S. Army Corps of Engineers Clean Water Act section 404 Regional General Permit 12, which includes Section 7 consultation for the Endangered Species Act (ESA).

A Biological Opinion (BO) from the National Marine Fisheries Service (NMFS) was received on May 26, 2016, which concluded formal consultation for activities in the California Department of Fish and Wildlife (CDFW) Fisheries Restoration Grant Program included under the five-year Regional General Permit (NMFS, 2016). The Regional General Permit authorizes minor fill discharges of earth, rock, and wood associated with the salmonid habitat restoration activities. These activities conform to the state law and are implemented consistent with the *California Salmonid Stream Habitat Restoration Manual*, (Flosi et al., 2010).

Analysis for effects to Endangered Species is covered through the programmatic documents discussed above. In addition, the project was analyzed for aquatic Forest Service Sensitive Species under a Fisheries Biological Evaluation and aquatic management indicator species were analyzed in a separate Management Indicator Species document (see Wildlife Resource Report).

Methodology

This analysis of effects to anadromous fish habitat uses habitat indicators (See Table 4 for current conditions of baseline indicators) from the *Analytical Process for Developing Biological Assessments for Federal Actions Affecting Fish within the Northwest Forest Plan Area* (USDAUSDOC- USDI 2004). Indicators are used to assess the existing environment of anadromous systems, with each Indicator labeled as to if it is “Properly Functioning,” “Functioning-At-Risk,” or “Not Properly Functioning” for a given watershed. The Analytical Process (AP) utilizes key indicators of habitat quality (habitat indicators) and was formulated to standardize evaluations of actions and effects for conferencing and consultations under Section (§) 7(a)(2) of the ESA, focusing on salmonid fishes within the Northwest Forest Plan (NFP) area. The information developed through the AP generally also satisfies the information requirements for Essential Fish Habitat (EFH) consultation for Pacific salmon under the Magnuson Stevens Fisheries Conservation and Management ACT and its implementing regulations (50 CFR Part 600).

The process relies on identification of Project Elements (discrete activities within the project), evaluation of Project Elements for each habitat indicator are made using the effects factors. The analysis evaluates the potential causal mechanism for effects to an indicator from one or multiple Project Elements. Analysis is done to determine if the effects are purely neutral or positive on fish habitat indicators, or if negative effects are negligible or discountable. The project elements, habitat indicators, effects factors, and potential effects are displayed in Table 4, below.

Table 4. Project Elements, Habitat Indicators, and Effects Factors for determining Potential Effects.

Project Elements	Habitat Indicators	Effects Factors	Potential Effects
1. Road Access	Water Quality: <i>Temperature, Suspended sediment/turbidity, Chemical contamination/nutrients</i> Habitat Access: <i>Physical barriers</i> Habitat Quality: <i>Substrate/embeddedness, LWD, Pool frequency, Pool</i>	Proximity ~ The geographic relationship between the project element or action and the species/designated critical habitat. Probability ~ The likelihood that the species or habitat would be exposed to the biotic or abiotic effects of the project element or action to the indicator. Magnitude ~ The severity and intensity of the effect.	Negative
2. Excavation			Neutral
3. Large Woody Debris Placement			Positive
4. Tree Planting			

5. <i>Cattle Fencing</i>	<i>quality, Off-channel Habitat, Refugia</i> Channel condition and dynamics: <i>Average width/ maximum depth ratio, Streambank condition, Floodplain connectivity</i> Flow/hydrology: <i>Change in peak/base flows, Increase in drainage network</i> Watershed conditions: <i>Road density and location, Disturbance history, Riparian Reserves</i>	Distribution ~ The geographic area in which the disturbance would occur (may be several small effects or one large effect). Frequency ~ How often the effect would occur. Duration ~ How long the effect would last. Potential categories include (a) short-term event whose effects subside immediately (pulse effect); (b) sustained, long-term effect, or chronic effect whose effects persist (press effect); and (c) permanent event that sets a new threshold for a species' environment (threshold effect). Timing ~ When the effect would occur in relation to the species' life-history patterns. Nature ~ Effects of the action on elements of a species' life cycle, population size or variability, or distribution; or on the primary constituent elements of critical habitat, including direct and indirect effects.	
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As the Analytical Process directs, the Proximity, Probability, and Magnitude factors are to be considered first and in that order. If either of the following conclusions are made, no further analysis of the Project Element for that indicator is needed:

- 1) There is no probability or there is a discountable (extremely unlikely to occur) probability of the impact occurring; and/or
- 2) The magnitude of the effect is insignificant (not able to be meaningfully measured, detected, or evaluated) or non-existent.

Spatial and Temporal Bounding of Analysis Area

The larger spatial boundary for this analysis is the Shiltos Creek – North Fork Salmon 7th-field watershed. The analysis area is defined for this purpose as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action” (50 CFR 402). The analysis area was further refined as follows:

- Shiltos Creek and its confluence with the North Fork Salmon River are outside of and upstream from the project area and would not be impacted by Project Elements. Therefore, Shiltos Creek would be excluded from further analysis.
- Kelly Gulch is upstream from the project area and would also be excluded from analysis with the exception of the Kelly Gulch delta complex located below the Kelly Gulch/Salmon River Road Bridge. It is part of the North Fork Salmon River Kelly Bar complex and would be influenced by the project.
- Baseline conditions at the project site would be considered on the North Fork Salmon River and downstream of the project site unless the habitat indicator is based on watershed conditions.

The temporal analysis timeframe includes effects during implementation, short-term effects expected to occur within the first year following implementation, and long-term effects (greater than one year).

Maps of the analysis area are located within the Biological Evaluation illustrate the analysis area and proximity to anadromous species.

Affected Environment

For a more detailed description of the affected environment, refer to the *Kelly Bar Off-Channel Fisheries and Riparian Habitat Enhancement Project – Basis of Design Report* (Michael Love and Associates, 2016).

Data sources used to determine historical and current anadromous and resident salmonid distribution and habitat condition included: (1) Forest GIS layers; (2) CalFish online database; and (3) Habitat and fish presence surveys performed by Forest Service personnel or contractors. This information, as well as scientific literature, field review, project water quality and geology reports, and best professional judgment, were the bases for evaluating impacts to aquatic resources in the project area.

The full fisheries Biological Evaluation includes specifics in regards to biology of analysis species, as well as survey records and distribution in the project streams along with listed references. The table below illustrates existing surveys to determine the presence or absence of a species in the project area. Table 5 summarizes actual and potential occupancy by analysis species in the project area.

Table 5. Summary of actual and potential occupancy by analysis species within the Shiltos Creek- North Fork Salmon 7th-field watershed, including Kelly Gulch and adjacent North Fork Salmon River.

Species	Shiltos Creek – NF Salmon 7 th -field watershed
Coho	X
Chinook	X
Steelhead	X
Resident rainbow trout	X
Pacific lamprey	X
Klamath River lamprey	P
X – confirmed present P – potential presence	

Baseline Conditions of Habitat Indicators

Table 6 below illustrates the existing conditions of the project area based on the habitat indicators, this information serves as the baseline for comparison of the effects of the alternatives of this project. Rational to support the information in the table is located in the Fisheries Biological Evaluation located in the Project Record.

Table 6. Existing conditions of the project area for fisheries indicators.

Pathway and Indicator	Environmental Baseline		
	Properly Functioning	Functioning – At Risk	Not Properly Functioning
Temperature		X	
Suspended Sediment – Turbidity	X		
Chemical Contamination/Nutrients	X		

Pathway and Indicator	Environmental Baseline		
	Properly Functioning	Functioning – At Risk	Not Properly Functioning
Physical Barriers	X		
Substrate Character and Embeddedness		X	
Large Woody Debris			X
Pool Frequency and Quality		X	
Off-Channel Habitat		X	
Refugia		X	
Average Width and Maximum Depth	X		
Streambank Condition	No Data – likely properly functioning		
Floodplain Connectivity		X	
Change in Peak and Base Flows	X		
Increase in Drainage Network		X	
Road Density & Location	X		
Disturbance History & Regime		X	
Riparian Reserves – Northwest Forest Plan		X	

Environmental Consequences

Alternative 1 – No Action

Direct Effects and Indirect Effects

Under the No Action alternative, no treatments as proposed would be implemented. If the No Action Alternative is selected, there would be no project caused disturbance within the 7th-field watershed. However, Kelly Bar and West Bar both currently have degraded fish and riparian habitat.

The No Action Alternative would continue to directly and adversely affect aquatic resources by maintaining poorly developed side channels that lack complex habitat, including large woody debris. The river would continue to flush water, sediment, organic material, and racking wood too quickly through the project area. Kelly Bar and

West Bar would continue to consist mostly of barren, large alluvial floodplain with several sparsely vegetated, discontinuous, remnant high-flow side channels and vegetated alluvial terraces. The side channels and two ponds on Kelly Bar would remain largely dry throughout the summer and fall, and would continue to provide only marginal habitat for SONCC coho and other salmonids.

Alternative one would not change any of the habitat indicators and all effects would remain neutral because the Project Elements would not be implemented. Effects to overall baseline conditions would be neutral and the project area would not be changed.

Cumulative Effects

There would be no cumulative impacts to fisheries resources from the No Action Alternative. Past and ongoing events within or adjacent to the project area are considered to be part of the existing condition.

Alternative 2 – Proposed Action

Direct Effects: Direct effects to Forest Service Sensitive Species and their habitat may occur as a result of project implementation due to:

- Fish removal activities that may occur as a result of project activities or possible mitigation measures.
- Equipment access and construction that would occur within or at the margins of the stream channel of Kelly Gulch and the North Fork Salmon River.

Effects from fish relocation would be significantly minimized due to implementation of the project design features as described in Chapter 2, there are additional minimization measures outlined within the grant stipulations for implementation of the project. According to the Biological Opinion (NOAA, 2012) issued for FRGP restoration projects, “Effects associated with fish relocation activities would be significantly minimized due to the multiple minimization measures that would be utilized, as described in the section entitled, *Measures to Minimize Injury and Mortality of Fish and Amphibian Species During Dewatering* within Part IX of the Restoration Manual.” Any mortality that may happen would not significantly reduce the number of juvenile salmonids and would not affect the continued existence of salmonid analysis species populations at the site or watershed scale. Lamprey are not expected to be affected by any possible relocation activities.

Fish temporarily avoiding equipment crossing locations and activity sites are not likely to experience reduced feeding success nor a significantly higher probability of exposure to predators. Resource protection measures including Project Design Features and Best Management Practices (Appendix B) would decrease the probability and magnitude of potential impacts to aquatic resources, with particular focus on reducing the potential for mobilization of suspended sediment and direct physical disturbance to fish and salmon redds.

Table 7. Summary of Direct effect on analysis species and their habitat for Project Element/Indicator combinations.

Indicators 0 = neutral effect + = positive effect - = negative effect	Road Access	Excavation	Large Woody Debris Placement	Tree Planting	Cattle Fencing	Summary Comments
Direct Effects						
Effects to Fish	-	-	+	0	0	Any mortality that may happen from fish removal activities would not significantly reduce the number of juvenile salmonids and would not affect the continued existence of salmonid analysis species populations at the site or watershed scale. Lamprey are not expected to be affected by any possible relocation activities. Any direct disturbances to analysis species from harassment or elevated turbidity would be localized and short-term.

Indirect Effects: Potential indirect effects to aquatic resources would occur as a result of equipment access and operation, installation of wood structures, installation of boulder weirs and excavation of off-channel habitat. Indirect effects to fish could also occur as a result of low dissolved oxygen levels in Willow Pond, but mitigation and monitoring is expected to make it unlikely that many fish would be lost. However, any detrimental effects would be localized and would impart no consequential impact to fish or fish habitat, including coho and coho Critical Habitat. There would be multiple benefits to fish and fish habitat upon completion of the project; some improvements would be immediate, whereas others might require months or years to be observed. The project would increase the abundance of complex off-channel rearing habitat with high intrinsic potential for year-round rearing of juvenile salmonids by providing both high-flow and thermal refugia. Importantly, the post-implementation monitoring and maintenance plan would allow for identification of low water quality and presence of invasive species; it also specifies mitigation actions to be taken in the event that undesirable or unintended conditions arise.

In the long-term, project implementation is expected to have a beneficial effect on temperature of waterbodies within the project area:

- Willow Pond would be excavated to a depth of 3-4 ft below the summer groundwater level in order to develop thermal stratification, which would retain cooler waters at the bottom of the pond.
- The pond shoreline and seasonal channel (excavated to provide seasonal fish ingress and egress to the pond) would be excavated to a depth where riparian vegetation can be supported by groundwater during the latter part of the dry season.
- Willow baffles would be installed on the spoil areas and on the east side of the alcove and seasonal channel, and would provide shade to the two channels. Diverse riparian planting of native vegetation would occur along the channels.
- Tailing piles would be left undisturbed to protect the existing riparian trees that are established within them; these trees would provide shade to the new Willow Pond and continue to provide shade to the North Fork Salmon River.

The project is expected to impart a favorable effect to large woody debris in the project area immediately following implementation. In the short (less than one year) and long (greater than one year) term following

project completion, large wood within the project area, and the processes which rely upon the debris, would be benefitted. Although the structures are not a replacement for naturally produced large wood, they would serve as an interim solution as the riparian zone continues its very long-term recovery from hydraulic mining, flood scour, and other human impacts. The development of a riparian zone capable of supplying large wood (conifers are preferred due to their size and decay resistance) is a process which might require decades to over a century (in the case of conifers), and is dependent upon the occurrence of events such as large floods. The benefits are designed to last about 25 years. However, the features are designed to be self-sustaining. Therefore, habitat benefits may last much longer than the design life of the project.

Any negative effects from sediment, slight increase in localized temperature (short-term), small reduction (short-term) in Riparian Reserves and a slight chance of chemical contamination would be minimized and effects are not expected to cause mortality, reduce the numbers of analysis species, or have any long-term negative effects on analysis species habitat.

Off-channel habitat enhancement would benefit the condition of several indicators in the long-term, particularly Temperature, Sediment/Substrate, Large Woody Debris, Off-Channel Habitat, Refugia, Floodplain Connectivity, and Riparian Reserves. Benefits would primarily be localized in nature at the site level and would not be of sufficient degree to permit an upgrade from current baseline functionality when considered at the larger reach or landscape scale (i.e. North Fork Salmon River 5th field watershed).

Table 8. Summary of indirect effects on analysis species and their habitat for Project Element/Indicator combinations.

Indicators 0 = neutral effect + = positive effect - = negative effect	Road Access	Excavaation	Large Woody Debris Placement	Tree Planting	Cattle Fencing	Summary Comments
Indirect Effects						
Temperature	0	-	0	+	+	Potential short-term impact to existing waterbodies due to reduction in riparian vegetation; long-term benefit due to creation and enhancement of off-channel thermal refuge habitat and increased riparian shading.
Turbidity/ Sediment Substrate	-	-	+	0	0	Turbidity may be present during and for a short time following implementation (see Water Quality Report). Fine sediments may be mobilized during and for a short time after implementation; erosion would return to baseline or decrease long-term as streambanks stabilize (see Water Quality Report; Geology/Soil Resources Report). Increased channel complexity and reduced water velocity would result in better sorting of gravels and improved spawning and rearing habitat, albeit locally. Any effects to fish would be discountable and is not expected to cause mortality or long-term effects.
Chemical Contamination/ Nutrients	-	-	0	0	+	No chemical treatments, fertilizers, or nutrient treatments would be used; BMP/PDFs for fuel use, channel crossings, and use of equipment in or near the stream.
Large Woody Debris	0	0	+	+	0	Several types of wood structures would be installed at the inlets of the side channels, along the side channels, and within the ponds on Kelly Bar and West Bar. In the short and long-term after implementation, LWD presence in project area would be benefitted.
Pool Frequency and Quality	0	+	+	0	0	Large wood structures in the side channels would create new off-channel pool habitat and increase quality compared to existing conditions.

Indicators 0 = neutral effect + = positive effect - = negative effect	Road Access	Excavaation	Large Woody Debris Placement	Tree Planting	Cattle Fencing	Summary Comments
Indirect Effects						
Off-Channel Habitat	0	+	+	0	0	The project would increase the abundance of complex off-channel rearing habitat with high intrinsic potential for year-round rearing of juvenile salmonids by providing both high-flow and thermal refugia.
Refugia	0	+	+	+	0	Large wood complexity and enhancement of side channels, alcoves, and ponds would provide for increased fish habitat functionality and connectivity in both the short and long-term.
Width/Depth Ratio	0	+	+	0	0	Excavation of the cobble bar near the mouth of Kelly Gulch would enhance connectivity to the North Fork Salmon River, but the project would not impact the width/depth ratio of the stream channel along most of its length.
Streambank Condition	-	+	+	+	0	Short-term instability during and after implementation. In the long-term, bank stability is expected to be similar to the existing condition, with areas of localized improvement.
Floodplain Connectivity	0	+	+	0	0	Connectivity would be improved in both the short and long-term. The project would enhance hydrological linkage between the main channel and off-channel areas, and would reduce the potential for future degradation.
Road Density and Location	-	0	0	0	0	No new system roads would be constructed. Temporary crossings installed over Kelly Gulch (culvert) and the North Fork Salmon River (bridge) would be removed after construction. Existing roads would be blocked after use.
Disturbance History and Regime	0	+	+	0	0	Although there is no change in disturbance and erosion indices, the project would address some legacy anthropogenic impacts.
Riparian Reserves	0	-	+	+	0	Project activities would impart minor, short-term effects. Long-term benefits are expected as riparian area recovers and functionality and complexity of off-channel habitat increase.

Effects of Alternative 2 as Compared to Baseline of Habitat Indicators

Table 9 below illustrates the effects of Alternative 2 to the functioning condition of the habitat indicators as compared to the baseline condition. Rational for the indicators is located in the Fisheries Biological Evaluation located in the Project Record. Under Alternative 2, baseline conditions would either be maintained or move towards a restored condition. The proposed action is not expected to degrade any of the existing watershed conditions at the project scale.

Table 9. Effects of Alternative 2 on the environmental baseline of the habitat indicators.

Pathway and Indicator	Baseline Condition	Effects of Alternative 2
Temperature	Functioning – At Risk	Maintain, trending towards restoring

Pathway and Indicator	Baseline Condition	Effects of Alternative 2
Suspended Sediment – Turbidity	Properly Functioning	Maintain, trending towards restoring
Chemical Contamination/Nutrients	Properly Functioning	Maintain
Physical Barriers	Properly Functioning	Maintain
Substrate Character and Embeddedness	Not Properly Functioning	Maintain, trending towards restoring
Large Woody Debris	Not Properly Functioning	Maintain, trending towards restoring
Pool Frequency and Quality	Functioning – At Risk	Maintain
Large Pools	Functioning – At Risk	Maintain
Off-Channel Habitat	Functioning – At Risk	Maintain, trending towards restoring
Refugia	Functioning – At Risk	Maintain, trending towards restoring
Average Width and Maximum Depth	Properly Functioning	Maintain
Streambank Condition	No Data – Likely Properly Functioning	Maintain
Floodplain Connectivity	Functioning – At Risk	Maintain, trending towards restoring
Change in Peak and Base Flows	Functioning	Maintain
Increase in Drainage Network	Functioning – At Risk	Maintain
Road Density & Location	Functioning	Maintain
Disturbance History & Regime	Functioning – At Risk	Maintain
Riparian Reserves – Northwest Forest Plan	Functioning – At Risk	Maintain

Cumulative Effects

There is the potential for cumulative impacts to aquatic resources from current and reasonably foreseeable future projects within the vicinity of the Kelly Bar Habitat Enhancement Project, these effects are expected to be small and localized, and would not lead to a shift in the determinations made for the effects to the habitat indicators within the analysis area.

Effects Determination

Coho and Coho Critical Habitat

Determination: Likely to adversely affect (LAA) coho salmon and its critical habitat.

The determination for this project is based on the NOAA Restoration's Center Biological Assessment and National Marine Fisheries Biological Opinion dated March 21, 2012. It is NMFS's opinion that the proposed projects occurring in the Northern California Office of NOAA's National Marine Fisheries Service is not likely to jeopardize the continued existence of SONCC coho salmon and is not likely to destroy or adversely modify designated critical habitat for SONCC coho salmon. ESA related determinations are made based on the potential for an individual of the species to be directly affected, regardless of potential benefit from project activities to the species habitat.

Essential Fish Habitat

Essential Fish Habitat consultation was prepared pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act. The proposed action includes areas identified as EFH for coho salmon and Chinook salmon under the Pacific Coast Salmon Fishery Management Plan. Based on the analysis under the NOAA Restoration Center's request for consultation, NMFS concludes that the project would adversely affect EFH for coho and Chinook salmon, however, the project contains adequate measures to avoid, minimize, mitigate, or otherwise offset adverse effects to EFH (NOAA, 2012).

Fish Sensitive Species Determination

A trend toward ESA listing of aquatic Forest Service Sensitive Species, is not anticipated and viability is not at risk. The project does not adversely modify their habitat in the short or long-term and would provide long-term benefits to habitat conditions. This project may affect individual Forest Service Sensitive Species but is not likely to lead to a trend towards listing for the following species:

- Steelhead trout (*Oncorhynchus mykiss*) Klamath Mountains Province DPS
- Chinook salmon (*Oncorhynchus tshawytscha*) Upper Klamath and Trinity Rivers (UKTR) ESU
- Pacific lamprey (*Entosphenus tridentatus*)
- Klamath River lamprey (*Entosphenus similus*)

River/Stream Species Association (Fish) - Management Indicator Species

- Steelhead trout (*Oncorhynchus mykiss*) Klamath Mountains Province DPS
- Rainbow trout (*Oncorhynchus mykiss*)

While there may be some short-term, habitat quality impacts, the long-term response of the project is expected to benefit both steelhead and rainbow trout. The habitat conditions and overall populations of steelhead/rainbow trout would not be significantly affected compared to the entire North Fork Salmon River Watershed and habitat availability is expected to increase at the local scale (see Wildlife Resource Report).

Compliance with law, regulation, policy, and the Forest Plan

The project is covered under the programmatic US Army Corps of Engineers Clean Water Act section 404 Regional General Permit 12, which includes Section 7 consultation for the Endangered Species Act. A Water Quality Certification (Clean Water Act section 401) is in progress and a Construction General Permit Waiver has been received from the State Water Resources Control Board. A Section 1600 Streambed Alteration Agreement with California Department of Fish and Wildlife is in progress; though it is not required on federally managed lands, it is required by the funding agency.

Soils and Geologic Resources

Methodology

Analysis Indicators and Measures

- Potential for the project to cause hillslope instability, which is measured by determining how likely the project is to change the mass balance of the hillslope.
- Potential for naturally occurring asbestos to be disturbed, which is measured by determining if any ultramafic bedrock would be disturbed during the project implementation.

The functioning category of soil productivity in the project area, which is measured by determining the effects of the project on soil stability, organic matter, soil strength, and moisture regimes.

Spatial and Temporal Bounding of Analysis Area

The spatial analysis boundary includes the entire Kelly Bar alluvial complex (Kelly Bar and West Bar), the active channel of the North Fork Salmon River including all side channels and overflow channels on the bar complex, the full length of the existing access route from the Sawyers Bar Road parking area (adjacent to the Kelly Gulch bridge) onto Kelly Bar, and the hillslope between Sawyers Bar Road and Kelly Bar. This is the extent that effects are likely to be noticeable for the indicators defined above and is inclusive of all areas in which ground disturbing project activities would occur. The temporal bounds for the analysis is five years for the hillslope instability and soil productivity. This is the typical duration for an increase in soil erosion as well as how long it would likely take for any changes in hillslope mass balance to become apparent (likely during a 2-10 year storm event). The temporal bounds for the naturally-occurring asbestos analysis is during project implementation only. Dust generated during implementation activities would settle within a few hours of cessation of work.

Affected Environment

The project area is within the active high-water channel and floodplain bar of the North Fork Salmon River. This area and numerous areas upstream on the North Fork Salmon River and several tributary streams have previously been placer mined via a variety of methods including ground-sluicing, hydraulic mining, drifting, and dredging. This resulted in the introduction of vast quantities of alluvial material stored in high bars, terraces, and other paleofluvial features into the active river channel. Introduced fine sediment and organic matter has since moved through the river system, but introduced coarse alluvium (gravel- to boulder-sized) has not transported through the river system, resulting in widespread channel aggradation, confinement, pool in-fill, and other significant changes to channel and bar morphology. The Kelly Bar alluvial complex has been largely shaped by the interaction of these physical remnants of historic mining activities and fluvial processes.

With the exception of one area with very limited surface exposure, there is no ultramafic bedrock within the project area. The one location where ultramafic bedrock may be present within the project area is in the furthest downstream vicinity of West Bar where the North Fork Salmon River crosses a narrow band of serpentine/serpentinized peridotite. Chrysotile, a fibrous phyllosilicate mineral (asbestos), could occur within this narrow band. Geologic mapping and on-site observation indicates that all bedrock on West Bar is overlain by alluvium and that the narrow band of ultramafic material occurs only at the very outermost margins of the project area upslope of the active river bar.

Analysis of historical aerial photographs dating back to August 1944 indicate that the alluvial complex is relatively stable, having been significantly rearranged only by the 1964 flood event, an approximate 90-year recurrence interval flood. Vegetation on the bar is mostly sparse and is generally scoured away during high water events (>10 year recurrence interval events) with re-establishment occurring between floods. Other than one small stand of trees on Kelly Bar, the entire alluvial bar complex was completely scoured of vegetation by the 1964 flood. The 1997 and 2005 floods have similarly, though to a lesser degree, scoured the bar of most vegetation and the pattern of present day vegetation can be traced to these events. Vegetation on the river bars contributes to the stabilization of the bars in lesser flood events. The frequency of flooding on the alluvial bar complex, however, prevents the development of soils and this limits the additional establishment of vegetation.

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

There would be no action taken in the No Action Alternative so there would be no effect to geologic or soils resources.

Cumulative Effects

There would be no direct or indirect effects as a result of the No Action Alternative so there would be no cumulative effects.

Alternative 2

Direct Effects and Indirect Effects

The proposed action would take place entirely within the active river channel and recent alluvial deposits that comprise the contemporary floodplain and river bars (Michael Love and Associates, 2016). The proposed action would not disturb any hillslopes and, therefore, is not likely to increase hillslope instability.

Ultramafic material may be present within the project area, though it could only potentially occur at the very outermost margins of the project area upslope of the active river bar. Thus, it is unlikely that this project, which works exclusively within alluvial deposits and river channel, would encounter the ultramafic bedrock. However, it is possible that errors in the geologic mapping exist and that alluvium currently obscures this from view. In the unlikely event that ultramafic bedrock is discovered during project implementation, California Air Resources Board required practices for construction and grading operations would be followed. Given the extremely small extent of ultramafic bedrock exposure within the project area, its mapped location upslope of the river bar, the thick cover of alluvium on the river bar, and the mitigations to be followed in the event of encountering ultramafic bedrock, the probability of disturbing and distributing naturally-occurring asbestos is very low.

Heavy equipment would need to access the active alluvial floodplain, river bar complex, and channel in order to implement this project. This could cause a small amount of soil compaction along the existing vehicle access route from the Sawyers Bar Road parking area onto Kelly Bar (a distance of about 42 meters). This route has provided vehicle and equipment access onto Kelly Bar in the past and is not likely to compact substantially with additional use as proposed in this project. Regardless, soil compaction would be mitigated by utilizing tracked equipment whenever possible, minimizing the number of vehicle and equipment trips on to and off the river bar, and by de-compacting soils following construction, if necessary. Work would be conducted during dry conditions, disturbance to existing vegetation would be kept to the minimum amount necessary to implement the project, erosion controls would be utilized, and native plant revegetation and additional riparian planting would ensure ongoing soil stability and production. Any localized effects to soil on the access route would be minimal and would represent a short-term impact. No developed, classifiable soils are found within the active floodplain, river bar, or channel. The entire bar complex was scoured during the 1964 flood event, with only one small area on Kelly Bar having retained vegetation that existed prior to the flood. This area would not be disturbed by the project. Therefore, the project would have no effect on soils other than potentially along the existing equipment access route. The minimal amount of soil disturbance, coupled with mitigations would ensure compliance with Forest Plan standards and guidelines (Forest Plan, Standard and Guides 3-2, page 4-20). The project area would continue to be in the properly functioning category for soil productivity.

Additionally, Project Design Features and Best Management Practices designed to reduce impacts to soils resources (Appendix B) are integrated into the proposed action.

Cumulative Effects

Current or reasonably foreseeable future projects in the analysis area are minimal and limited to small surface disturbances. These activities are not expected to affect soils or geologic resources, so there are no cumulative effects for geologic and soils resources.

Compliance with law, regulation, policy, and the Forest Plan

This project complies with direction in Forest Service Manual 2550 (Soil Management) (USFS, 2012) and the Forest Plan standards and guidelines (USFS, 2010). The project is also in compliance with the Asbestos Air Toxic Control Measures (CARB, 2002).

Botanical Resources and Non-Native Invasive Species

Methodology

A pre-field review was conducted to determine which species of concern are present, and for which species a field survey may be necessary (Appendices A1 and A2 in Botany Resource Report). There are no known sites and surveys were not triggered for any species listed as Threatened, Endangered, or Proposed. The pre-field review (Appendix A1, step 3 in Botany Resource Report) revealed that no sensitive plant species are known to occur within the project area and that the bryophyte species *Mielichhoferia elongata* (Forest Service Sensitive) could occur in the area. Field surveys were conducted for the specific project area. However, the species was not observed during a field survey conducted on November 1st, 2017, nor was suitable habitat found in the analysis area.

Analysis Indicators and Measures

Threatened, Endangered, or Proposed Species

There are no plant species listed as Threatened, Endangered, or Proposed (Appendix B in Botany Resource Report) within the project area, therefore, there would be no impacts to analyze as a result of project activities and no further analysis completed for this category of plant species.

Sensitive Species

There are no plant species listed as Forest Service Sensitive within the project area, therefore, there would be no impacts to analyze as a result of project activities and no further analysis completed for this category of plant species.

Survey & Manage Plant Species

There are no known sites of any Survey and Manage plant species within the project area, additionally, under the Pechman Exemptions, the proposed action would not require surveys for the species listed as Survey and Manage within the Northwest Forest Plan (USFS, 2006). The Kelly Bar Habitat Enhancement Project complies with the 2001 Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guidelines (USFS, 2014). There would be no impacts to analyze for Survey and Manage species as a result of project activities.

Noxious Weeds

- Risk of spread or introduction of Noxious Weeds.

Because there would be no impacts to analyze for Threatened, Endangered, Proposed, Sensitive, or Survey and Manage botanical species the remainder of this analysis is focused on the analysis indicator for noxious weeds.

Spatial and Temporal Bounding of Analysis Area

The spatial boundary is the project area and adjacent access roads. The temporal boundary is the time it takes to complete project implementation and for successful revegetation, three to five years.

Affected Environment

The noxious weed species' *Centaurea maculosa* (spotted knapweed) and *Isatis tinctoria* (dyer's woad) occurs in the project area. Spotted knapweed, which is a priority weed species in the Salmon River Watershed, historically grew in large numbers on Kelly Bar, but active management since the late 1990s has significantly reduced the infestation. The seedbank is now assumed to be minimal, with only a few plants found per year in the vicinity. The dyer's woad at Kelly Bar is not being actively managed because it is not a priority at this location due to the proximity to other dyer's woad infestations, therefore a seed bank is present within the project area. Kelly Bar is currently vulnerable to weed spread and infestation due to proximity to the road and river, which frequently disturbs the bar during high flow events, as well as cattle trailing through the site in the fall. The limited vegetative cover and annual disturbance at the site makes for numerous openings vulnerable to establishment by opportunistic invasive species.

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

Under the no action alternative there would be no ground disturbing activities or use of equipment that could introduce or spread noxious weeds into or out of the project area. The no action alternative would have no effect to Klamath National Forest listed noxious weeds.

Cumulative Effects

There would be no effect to the risk of spread or introduction of noxious weeds and therefore, no cumulative effects.

Alternative 2

Direct Effects and Indirect Effects

The Kelly Bar Habitat Enhancement Project is proposing activities that include the use of heavy equipment to improve off channel habitat within the floodplain of the river. This work would create concentrated areas of ground disturbance within an area that is already annually disturbed during high flow events. The habitat within this project area is already vulnerable to noxious weed establishment due to the conditions of the site (limited vegetative cover, annual disturbance). Project activities are not expected to create areas that would be more vulnerable to noxious weed establishment than what currently exists. The risk associated with this project lies in the risk of either new noxious weed species being introduced from equipment used for implementation, or the risk of noxious weeds already present within the project area being spread to other locations on the Forest after implementation. Project Design Features have been incorporated into the proposed action to reduce this risk.

These features, including equipment washing, have been shown to be effective at reducing the spread of noxious weeds both into and out of project areas. Monitoring after project implementation would be effective in determining if any noxious weed species have been introduced or if project activities caused germination of existing seed bank at the site. Monitoring and a rapid response to any priority noxious weeds found at the site would be effective in preventing the establishment of noxious weeds within the project area. There is a low risk that the project would cause the introduction or spread of Klamath National Forest listed noxious weeds due to the anticipated effectiveness of project design features.

Cumulative Effects

The Jess Project, which would occur in the upper headwaters of the 7th Field watershed, and the Kelly Gulch Road culvert do not have direct overlap with the Kelly Bar Habitat Enhancement Project area, and there is very little overlap in road use between the two projects beyond use of the main County Road and Kelly Gulch Road. This project is expected to have a low risk of introducing or spreading listed noxious weeds with the implementation of project design features that include heavy machinery washing. When this project is combined with other on-going activities within the watershed, the risk of introduction or spread of weeds remains low.

Compliance with law, regulation, policy, and the Forest Plan

Threatened, Endangered, Proposed, and Sensitive Plants: This project complies with section 7 of the Endangered Species Act, as amended, Forest Service Policy (FSM 2670), and Klamath National Forest LRMP Standards and Guidelines for Sensitive plant species.

Survey and Manage Plants: Under the Pechman Exemptions, the proposed action would not require surveys for the species listed as Survey and Manage within the Northwest Forest Plan (USFS, 2006). This project complies with the 2001 Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guidelines (USFS, 2014).

Noxious Weeds: This project complies with the Forest Service Manual 2900 and Forest Plan Standards and Guidelines for noxious weed species.

Wildlife Resource

Methodology

Analysis Indicators and Measures

The proposed action was analyzed based on the following analysis indicators:

Threatened, Endangered, or Proposed Species - The likelihood that project implementation would lead to mortality, harm, failed breeding attempts, or displacement for wildlife species.

Sensitive Species - A habitat assessment was performed to estimate the potential impacts to preferred habitat of potentially present sensitive species.

Management Indicator Species (MIS) - For the MIS species, a habitat assessment was performed to estimate the stream miles and habitat acres disturbed by the proposed action.

Survey and Manage Species - Under the Pechman Exemptions, the proposed action would not require surveys for the species listed as Survey and Manage within the Northwest Forest Plan (USFS, 2006). The Project complies with the 2001 Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guidelines (USFS, 2014). There would be no impacts to analyze for Survey and Manage species as a result of project activities.

Migratory Bird Species – Effects to migratory birds are considered by the analysis indicators for Sensitive, MIS, and Threatened, Endangered, and Proposed migratory bird species and habitat. These analysis indicators are sufficient to determine effects to migratory bird species and a separate analysis is not necessary.

Spatial and Temporal Bounding of Analysis Area

The analysis area includes the project area and adjacent areas to which project-generated sounds could pose a potential for noise disturbance. This boundary is appropriate for assessing the project impacts as they might be experienced by existing wildlife species of concern within the project area.

The temporal bounding of the analysis area is the timeframe of effects to wildlife habitat encompassed by hydrologic, vegetation, and soil resources. The short-term temporal bound for the analysis, as it relates to hydrology, is 2 years and is based on the assumption that an overbank flow event has a high likelihood of occurring within 2 years of project implementation. The long-term temporal bound for the project is 10 years because it is expected that any potential reductions to stream shade (and indirect and cumulative adverse effects to water temperature) from project activities would recover within 10 years, if not more quickly. With regard to vegetation/soil, successful revegetation is expected to occur within 3-5 years.

Affected Environment

A review was conducted to determine which Endangered Species Act (ESA) Threatened, Endangered, Proposed, or Forest Service Sensitive species are present, and for which species a field survey may be necessary. A site visit was used to identify species' preferred habitat within the project area. An evaluation of species-habitat associations, presence of suitable or potential habitat, and a review of the literature on the effects to the species of concern were used to determine potential effects.

A site visit was conducted by Jessica Stauffer on 11/8/2017 to identify areas of potential habitat for FSS, and Migratory Bird species. No species of concern were observed.

Table 10. Threatened, Endangered, Proposed, and Sensitive wildlife species of concern present or potentially present in the project area.

SPECIES	STATUS
Northern Spotted Owl (<i>Strix occidentalis caurina</i>)	ESA Threatened; Forest Service Sensitive
gray wolf (<i>Canis lupus</i>)	ESA Endangered; Forest Service Sensitive
North American wolverine (<i>Gulo gulo luscus</i>)	ESA Proposed as Threatened; Forest Service Sensitive
blue-gray tailed dropper (<i>Prophyaon coeruleum</i>)	Forest Service Sensitive
Tehama chaparral snail (<i>Trilobopsis tehamana</i>)	Forest Service Sensitive
western bumble bee (<i>Bombus occidentalis</i>)	Forest Service Sensitive
Cascades frog (<i>Rana cascade</i>)	Forest Service Sensitive
foothill yellow-legged frog (<i>Rana boylii</i>)	Forest Service Sensitive
western pond turtle (<i>Emys marmorata</i>)	Forest Service Sensitive
northern goshawk (<i>Accipter gentilis</i>)	Forest Service Sensitive
willow flycatcher (<i>Empidonax trailii</i>)	Forest Service Sensitive

SPECIES	STATUS
Pacific fisher (<i>Martes pennanti pacifica</i>)	Forest Service Sensitive
fringed myotis (<i>Myotis thysanodes</i>)	Forest Service Sensitive
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	Forest Service Sensitive
pallid bat (<i>Antrozous pallidus</i>)	Forest Service Sensitive

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

If the No Action Alternative is selected, there would be no soil or vegetation disturbance within the project area; the habitat for special status wildlife species would remain the same as the current condition.

Cumulative Effects

There are no direct or indirect effects as a result the No Action Alternative so there are no cumulative effects.

Alternative 2

Direct Effects and Indirect Effects

Prior to working at individual features within the project footprint, an individual would precede the equipment on foot to displace fish and wildlife and prevent them from being injured. Any fish or wildlife in the work area shall be flushed in a safe direction away from the project site. Temporary crossings would be placed over the North Fork Salmon River (temporary bridge) and Kelly Gulch (temporary culvert); ground disturbance related to placement of the crossings would be minimal. No Trees would be removed along the North Fork Salmon River or Kelly Gulch for equipment access or operation; therefore, there would be no canopy shade loss over the North Fork Salmon River or Kelly Gulch. Construction activities have the potential to disturb soil and vegetation in the short term (equipment access, storage areas, placement of large woody debris, placement of temporary crossings and excavation), such areas may have minimal soil compaction and erosion, however the incremental area of ground disturbance for the project is minimal. The riverbanks would be minimally disturbed as a result of construction; the total soil disturbance for the project is about 4 acres. However, such disturbance would occur within the annual floodplain; areas annually disturbed by high flows. Additionally, Project Design Features (PDF) for wildlife resources are part of the project design and would be used to mitigate impacts to special status wildlife species (PDFs WL-1, WL-2, and WL-3). Disturbance associated with access or operation during the breeding season and project activities that generate noise in excess of current ambient levels may also result in potential short-term impacts to nesting birds. However, Project Design Features restrict project operations during the breeding season so this potential impact would be avoided.

Within the long-term, the proposed action has the potential to alter riparian and upland vegetation habitat. The potential long-term impacts to vegetation can be expected to last no more than 10 years. Project disturbance (construction and temporary access) would not result in canopy shade loss over the Salmon River or Kelly Gulch or associated degradation of the habitats preferred by aquatic and riparian associated special status species. However, the proposed action aims to enhance off-channel aquatic and riparian habitat on the North Fork Salmon River. Project activities are expected to result in the restoration of the riparian habitat on site to a more natural condition, which would enhance riparian vegetation and minimize removal of large riparian vegetation, improve

connectivity between Kelly Gulch and the Salmon River, enhance side channels and create alcoves on Kelly and West Bars, and enhance two off-channel ponds on Kelly Bar thereby increasing preferred habitat for aquatic and riparian associate species. Enhancing this habitat would meet Forest Plan Aquatic Conservation Strategy Objectives by aiding the recovery of fish habitat, riparian habitat, and water quality (6-46).

Northern Spotted Owl

The proposed action would not remove any suitable northern spotted owl habitat and is not expected to pose a direct danger of mortality, harm, failed breeding attempts or displacement of northern spotted owl individuals. To avoid direct effects associated with noise and human disturbance, a Limited Operating Period (LOP) is incorporated into the project design to prevent these activities between February 1 and July 9 (WL-1). Therefore, the proposed action would have no direct effects on northern spotted owl. No indirect effects (i.e., changes to Critical Habitat) to northern spotted owl are expected to result from implementation of the proposed action. Therefore, no measurable change to canopy closure would result nor would forest fragmentation occur. No suitable northern spotted owl habitat would be degraded, downgraded, or removed. Further, no adverse impacts to the existing habitat for northern spotted owl prey species, such as woodrats, are expected. Therefore, the proposed action would not result in any short- or long-term indirect effects to northern spotted owl.

The proposed project will have *no effect* on northern spotted owl and there would be *no effect* to NSO Critical Habitat because project activities would not be modifying the Primary Constituent Elements.

Gray Wolf

Gray wolf is not known from the project area. However, it has a large home range and range expansion could result in wolves re-inhabiting the general area at some point. Due to the small project footprint relative to the large home range size of gray wolf, the proposed project would not alter enough habitat to have any impact on the species. Further, gray wolf is highly mobile and capable of avoiding project-related disturbance.

Therefore, the proposed action would have *no effect* on gray wolf.

North American Wolverine

Habitat for North American wolverine is limited and low quality within the project area thus not likely used for reproduction, although possibly for foraging and individuals may traverse the area along the riparian corridor. There are no records of North American wolverine from within or adjacent to the project area. However, this species has a relatively large home range and is known to avoid areas where human disturbance is a factor. All proposed construction activities within the project area would occur in only very small portions of wolverine habitat and would be conspicuous enough as to likely be avoided by the species. Further, the project would not modify suitable wolverine habitat.

The proposed action would have *no effect* on North American wolverine.

Blue-gray Tailedropper

Blue-gray tailedropper is known from the greater project vicinity. However, the project area itself is slightly higher in elevation than is thought to be suitable for the species, which occurs at elevations of less than 820 feet. Elevations at the project site range from approximately 1,990 – 2,000 feet. Therefore, while the species is not expected to occur in the project area, its preferred elevation range is near enough to the project site that potential disturbance to suitable habitat was analyzed.

Total soil disturbance associated with the proposed project is about 4 acres. However, this disturbance would occur entirely within the annual floodplain and not upland sites most likely to be inhabited by blue-gray tailedropper. Further, site clearance is likely to result in the avoidance of impacts to any potentially occurring individuals. There are no known occurrences of this species within the project area and the likelihood of impacting this species is minimal because the timing for project implementation (late summer through early fall) would avoid disturbance to individuals.

The proposed project would have *no effect* on blue-gray tailed dropper.

Tehama Chaparral Snail

Tehama chaparral snail is known to occur in a number of locations in the Forest. However, there are no known sites in the project area. Although suitable habitat for the species occurs within the larger project vicinity, there is no talus habitat within the Kelly Bar Project site and the species is assumed absent for the purposes of this analysis.

The proposed action would have *no effect* on Tehama chaparral snail.

Cascades Frog

No surveys have been conducted for Cascades frog within the proposed project area. However, suitable habitat for the species does occur on the Salmon River and the species is considered present for the purposes of this analysis.

Ground-disturbing activities with the potential to impact foothill Cascades frog would occur on about 4 acres of suitable habitat for this species. However, site clearance and PDFs (WL-2) would result in the avoidance of direct impacts to any individuals.

The proposed action *may affect preferred habitat and individuals, but would not cause a trend toward federal listing* for foothill yellow-legged frog.

Foothill Yellow-legged Frog

No surveys have been conducted for foothill yellow-legged frog within the action area. However, suitable habitat for the species does occur.

Ground-disturbing activities with the potential to impact foothill yellow-legged frog would occur on about 4 acres of suitable habitat for this species. However, site clearance and PDFs (WL-2) would result in the avoidance of direct impacts to any individuals. Although there are no records of this species in the analysis area, incidental sightings have been reported from suitable habitat within the project vicinity and the species is considered present for the purposes of this analysis.

The proposed action *may affect preferred habitat and individuals, but would not cause a trend toward federal listing* for foothill yellow-legged frog.

Western Bumble Bee

Disturbance to streambank and riparian areas could potentially impact about 4 acres of western bumblebee preferred habitat. However, the short-term impacts of soil erosion and compaction would be reduced by appropriate work windows, PDFs, BMPs, and post treatment restoration efforts.

The proposed action *may affect preferred habitat and individuals, but would not cause a trend toward federal listing* for western bumble bee.

Western Pond Turtle

Western pond turtle is known to occur in the project vicinity, there have been incidental sightings within the project vicinity, and could occur at the project site. Therefore, ground-disturbing activities at the riverbank, side channels, and two off-channel ponds where western pond turtle habitat occurs may result in adverse impacts to individuals. Construction and temporary access routes would occur on about 4 acres of preferred habitat for this species. However, site clearance and PDFs (WL-2) would result in the avoidance of direct impacts to any individuals. If any western pond turtles or nests are observed they would be moved from the exclusion zone downstream or upstream of the work site, to a safe location, prior to construction.

The proposed action *may affect preferred habitat and individuals, but would not cause a trend toward federal listing* for western pond turtle.

Northern Goshawk

Surveys for northern goshawk were not conducted within the project area.

No northern goshawk nesting territories are known from the project vicinity and habitat at the site is not suitable for nesting. However, the project area could function as foraging and/or roosting habitat for the species. Site clearance and PDFs (WL-1) would result in the avoidance of effects to northern goshawk possibly occurring in the action area.

The proposed action would have *no effect* on northern goshawk.

Willow Flycatcher

Surveys for willow flycatcher were not conducted within the action area.

Riparian habitat within the action area is marginally suitable for willow flycatcher. Site clearance and PDFs (WL-1) would result in the avoidance of direct effects associated with mortality and noise or human disturbance of potentially breeding willow flycatchers.

The proposed action would have *no effect* on willow flycatcher.

Pacific Fisher

Fisher habitat is limited and low quality within the project area thus not likely used for reproduction or foraging, but the species may traverse the project area along the river corridor. There are no records of fisher from within or adjacent to the project area. However, this species is nocturnal, has a large home range and is known to avoid areas where human disturbance is a factor. All proposed construction activities within the project area would occur during daylight hours, would take place in only very small portions of fisher habitat and would be conspicuous enough as to likely be avoided by the species. Further, the project would not modify suitable fisher habitat.

The proposed action would have *no effect* on Pacific fisher.

Pallid Bat, Townsend's Big-eared Bat and Fringed Myotis

Many bat species, including those analyzed here, are susceptible to noise disturbance during the rearing of young and roosting periods both seasonally and daily. It is highly unlikely that noise disturbance from heavy equipment utilized within the proposed project areas would generate enough noise to disturb or affect these sensitive bat species. Noise levels would remain below critical thresholds due to distance from potential roosting areas and duration of use. Also, no snags or other structures that could provide potential roost sites for these species would be removed.

The proposed action would have *no effect* on pallid bat, Townsend's big-eared bat, or fringed myotis.

Management Indicator Species (MIS)

With the implementation of project design features, Alternative 2 would not limit the availability of habitat components necessary for Management Indicator Species within the project area. Overall, while individuals may be impacted and there may be some short-term, habitat quality impacts, the long-term response of the project is expected to benefit MIS species. The habitat conditions and overall populations of MIS species would not be significantly affected compared to the entire North Fork Salmon River Watershed and habitat availability is expected to increase at the local scale.

Cumulative Effects

The addition of this project to the ongoing activities within the watershed (mining, timber harvest, and fuels reduction), which are minimal and limited to small surface disturbances, in combination with restoration activities are not expected to produce adverse cumulative effects to sensitive wildlife species due to the small size of the project and specified PDFs and BMPs which would mitigate potential impacts of the project.

Compliance with law, regulation, policy, and the Forest Plan

The project complies with Forest Service Policy (FSM 2670), and Klamath National Forest LRMP Standards and Guidelines for Threatened, Endangered, Proposed, and Sensitive species. The project is covered under the programmatic US Army Corps of Engineers Clean Water Act section 404 Regional General Permit 12, which includes Section 7 consultation for the ESA. A Section 1600 Streambed Alteration Agreement with California Department of Fish and Wildlife is in progress, which includes timing restrictions for northern spotted owl.

Forest Plan

The Klamath National Forest is operating in full compliance with the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and the Northwest Forest Plan ROD was incorporated into the Forest's Land and Resource Management Plan (USFS, 1994). The Forest Plan adopts the ROD as the Federal contribution to the recovery of the northern spotted owl.

Survey and Manage Wildlife: Under the Pechman Exemptions, the proposed action would not require surveys for the species listed as Survey and Manage within the Northwest Forest Plan (USFS, 2006). This project complies with the 2001 Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guidelines (USFS, 2014).

2011 Northern Spotted Owl Recovery Plan

On June 28, 2011, the FWS released the final Revised Northern Spotted Owl Recovery Plan (USFWS, 2011). This 2011 revised edition replaced wholly the 2008 version. The 2011 plan describes recovery objectives or goals, primary recovery criteria, implementation, and recovery actions. The proposed project is consistent with the objectives of Recovery Action 32 because it would have no negative effect on suitable northern spotted owl habitat and is therefore in compliance with the Recovery Plan.

Critical Habitat

Critical Habitat for northern spotted owl was designated on January 15, 1992 (USFWS, 1992) and was revised August 13, 2008, becoming effective on September 12, 2008 and again on December 4, 2012 (USFWS, 2008, 2012). The 2008 re-designation modified the boundaries of the Critical Habitat Unit. The habitat is designated using multiple Primary Constituent Elements, effects to which, equate to effects to Critical Habitat whether or not northern spotted owls are present in the area. Critical Habitat Units was used in determining effects to northern spotted owl.

Heritage Resources

Methodology

The Forest is required to take into account the effects of all Forest undertakings on historic properties pursuant to Section 106 of the National Historic Preservation Act and the *Programmatic Agreement among the USDA Forest Service, Pacific Southwest Region (Region 5), California State Historic Preservation Officer, Nevada State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Process for Compliance with Section 106 of the National Historic Preservation Act for Management of Historic Properties by the National Forests of the Pacific Southwest Region (Region 5 PA)*. The following summarizes the effects of implementation of the Kelly Bar Habitat Enhancement Project on historic properties located within the project area.

The methodology used for this analysis consists of two components. The first is determining the area within which implementation of an alternative has the potential to have an effect. The second is establishing whether or not there are historic properties present within this area which may be affected by project implementation.

Establishing the area within which there was potential to have an effect resulted in the development of the Area of Potential Effect. The Area of Potential Effect was developed primarily based upon the actions associated with proposed alternatives. The Area of Potential Effect was also used to guide efforts associated with historic property identification.

Identification of historic properties within the Area of Potential Effect forms the second component of analysis. This effort involved three elements: pre-field research, field surveys, and consultation. Pre-field research involved a thorough review of existing and available information on known historic properties within the Area of Potential Effect. Field surveys were conducted within the Area of Potential Effect to locate and identify any previously unknown historic properties. Consultation efforts included soliciting information on historic properties from tribal organizations, the general public, and within the Forest Service.

Analysis Indicators and Measures

Impacts are assessed using criteria defined by regulations for Protection of Historic Properties (36 CFR Part 800). If an action could change in any way the characteristics that qualify the resource for inclusion on the National Register for Historic Places, it is considered to have an effect. An effect is a direct or indirect alteration of the characteristics of a historic property that qualifies it for inclusion on the National Register of Historic Places.

Effects to historic properties are classed into four categories based upon relative intensity:

- **Negligible:** The effect on archaeological sites would be at the lowest levels of detection—barely measurable with any perceptible consequences.
- **Minor:** The effect on archaeological sites would be measurable or perceptible, but it would be slight and localized within a relatively small area for a site or group of sites.
- **Moderate:** The effect would be measurable and perceptible. The action would change one or more character-defining features of a resource, but it would not diminish the integrity of the resource to the extent that its National Register of Historic Places eligibility would be jeopardized.
- **Major:** The effect on archaeological sites would be substantial, noticeable, and permanent. For National Register of Historic Places eligible or listed archaeological sites, the action would change one or more character-defining features of an archaeological resource, diminishing the integrity of the resource to the extent that it no longer would be eligible for listing on the National Register of Historic Places.

Spatial and Temporal Bounding of Analysis Area

The spatial bounding of the analysis area for the project is the Area of Potential Effect. The Area of Potential Effect is defined as any area within the project in which activities are proposed to occur, as well as areas utilized in support of those activities. The Area of Potential Effect differs from the more general project area in that it specifically refers to localized areas in which project-related activities are proposed. The Area of Potential Effect is used for effects analysis rather than the project area because archaeological sites are static resources. Because these resources are present at fixed locations, an action has to occur at or near that location to cause an effect. Thus, the Area of Potential Effect refines the analysis to only areas which are identified for actions to eliminate extraneous analysis.

Temporal bounding of this analysis is composed of two effects classifications: short- and long-term. Short-term effects are those which occur during or up to the first five years following implementation. Long-term effects are those which occur after the five-year period following implementation. Effects are classified as short- and long-term in order to distinguish between those effects most immediately associated with project implementation relative to effects considered for indefinite resource management purposes.

Affected Environment

The project is located within an area known to have historic archaeological sites, and though no archaeological sites have been identified within the Area of Potential Effect, one historic-era tailings pile was recorded immediately adjacent the Area of Potential Effect.

The project area is historically and culturally significant to the Karuk, Shasta, and Konomihu people. No traditional cultural properties, traditional or contemporary use areas, or specific areas of spiritual significance have been identified within the Area of Potential Effect of this project.

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

Implementation of Alternative 1 proposes that no management actions be taken. Therefore, there will be no direct or indirect effects to historic properties.

Cumulative Effects

Taking no management actions in the project area in combination with other actions in the reasonably foreseeable future would not result in cumulative effects to historic properties.

Alternative 2

Direct Effects and Indirect Effects

Implementation of Alternative 2 involves taking actions that have the potential to affect an archaeological site. However, using Standard Resource Protection Measures, as outlined in Appendix E of the Region 5 Programmatic Agreement and referred to as project design features during implementation, when effectively applied, would prevent any direct effects to the archaeological site. The Standard Resource Protection Measures for this undertaking include the physical demarcation and avoidance during implementation of the archaeological site adjacent the Area of Potential Effect. There would be no indirect effects as the result of implementing Alternative 2.

Cumulative Effects

Because effects to archaeological sites are location specific, implementation of past, present, and reasonably foreseeable future actions associated with other projects would not result in a cumulative effect to the site adjacent Area of Potential Effect for the project. There are no ongoing or future actions that overlap with the Area of Potential Effect within the project. At this time, the project design features eliminate the possibility of present or upcoming actions taking place within the boundaries of the site adjacent to the project Area of Potential Effect. Therefore, implementation of Alternative 2 would not have a cumulative effect on the archaeological site adjacent the Area of Potential Effect.

Compliance with law, regulation, policy, and the Forest Plan

This project complies with the Programmatic Agreement Among the U.S.D.A. Forest Service, Pacific Southwest Region (Region 5), California State Historic Preservation Officer, Nevada State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding the Process for Compliance with Section 106 of the National Historic Preservation Act for Management of Historic Properties by the National Forests of the Pacific Southwest Region (Region 5 PA). Management of archaeological sites according to the provisions set forth in the Region 5 PA is consistent with Forest Plan direction, as displayed in the Forest Plan Consistency Checklist, and is in compliance with the National Historic Preservation Act. Therefore, implementation of the project is consistent with Forest Plan direction and in compliance with law, regulation, and policy.

Wild and Scenic River

See the project record for a full analysis of compliance with the Wild and Scenic River management direction. The North Fork Salmon River is a Designated Scenic River for recreational opportunities. The outstandingly remarkable value for the river is fisheries. The management goals for this designation include that the free-flowing condition be maintained and the outstandingly remarkable value not be adversely impacted (Forest Plan, pg. 4-120:121). Also, Partial Visual Quality Objectives must be met in the Wild and Scenic River Corridor (Forest Plan, pg. 4-121). This means that the management activities may be noticeable but remain subordinate to the character of the landscape.

There would be a positive benefit to fisheries resources and habitat (see fisheries input). So, the outstandingly remarkable values would be benefited by this project. The visual effects of this project would be noticeable from the North Fork Salmon River during and immediately after project implementation. These effects would be subordinate to the overall landscape within three years of implementation and would not be noticeable after about 10 years once the vegetation has fully recovered. Therefore, the project would meet the Partial Retention Visual Quality Objectives. There would be no impacts to the free-flowing condition of the river and the impacts to water quality during project implementation are minimized to the extent practicable. There would be no direct and adverse effect to the river's free flow, water quality, or outstandingly remarkable values.

Air Resources

Siskiyou County is identified as in attainment for all criteria air pollutants under both state and federal standards. The project is not likely to lead to the non-attainment and is therefore consistent with the Conformity Rule. Dust emissions would be local, last only during construction, and would not lead to the violation of the Regional Haze Rule. Smoke from burning small piles of Himalayan blackberry and other non-native vegetation would be localized and short-term. All Forest Service and CalFire permits, regulations, and restrictions would be applied to any burning. The project is compliant with all applicable rules under the Clean Air Act.

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Appendix A – Project Maps

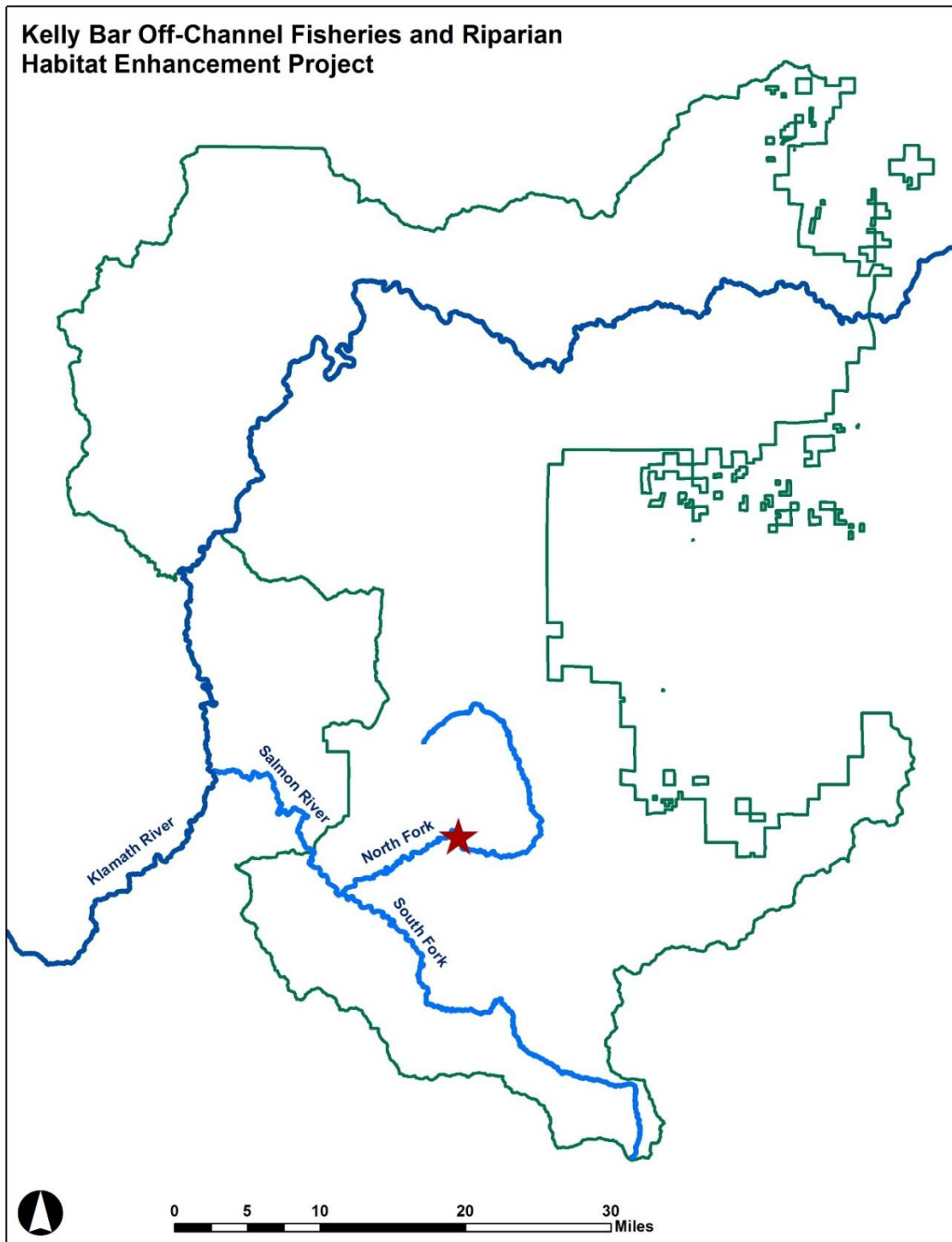


Figure 1: Vicinity map showing the project area relative to the Forest boundary.

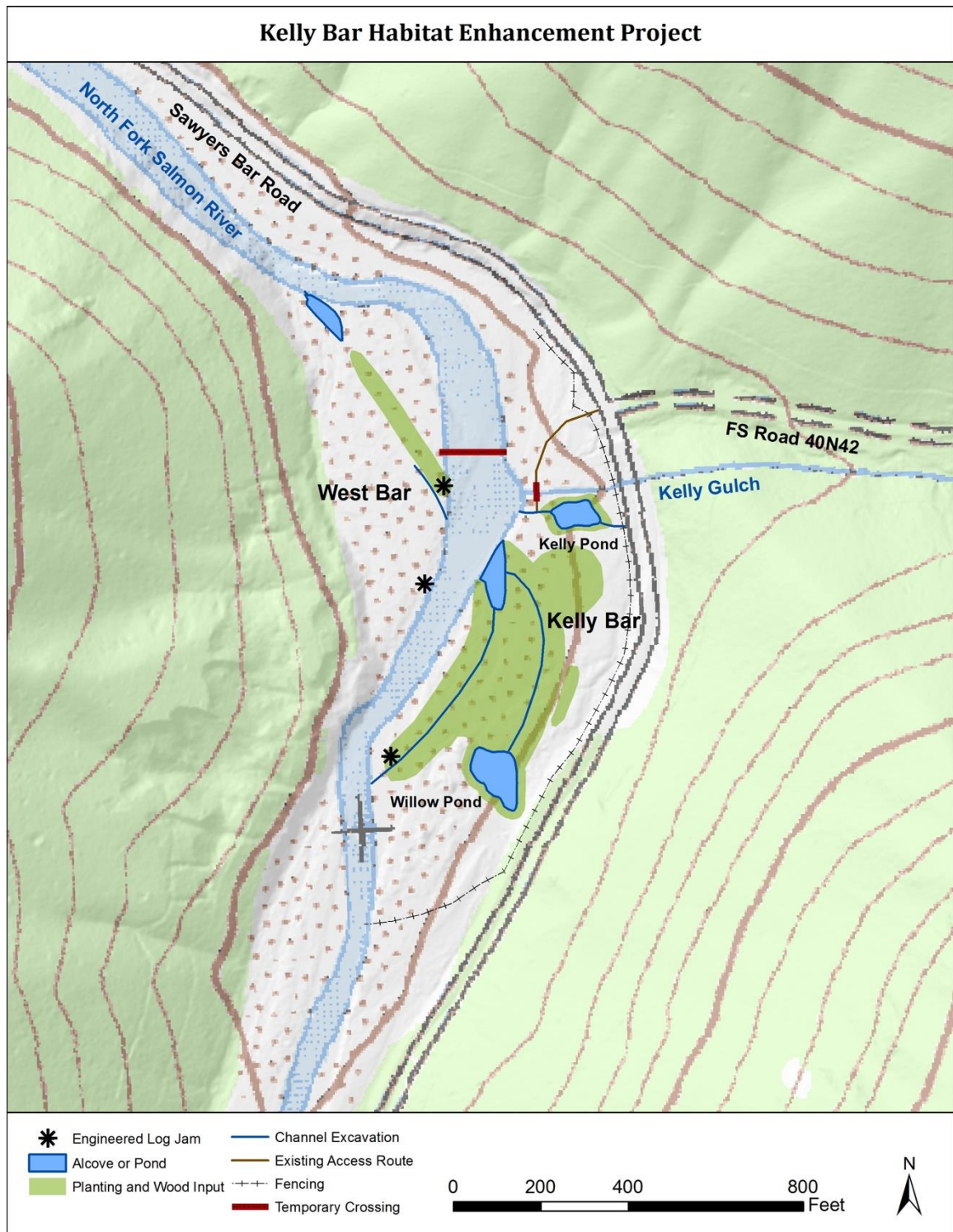


Figure 2: Project area map.

Legend

Kelly Bar Habitat Enhancement Project Area

**Kelly Bar Habitat Enhancement Project
Management Areas**

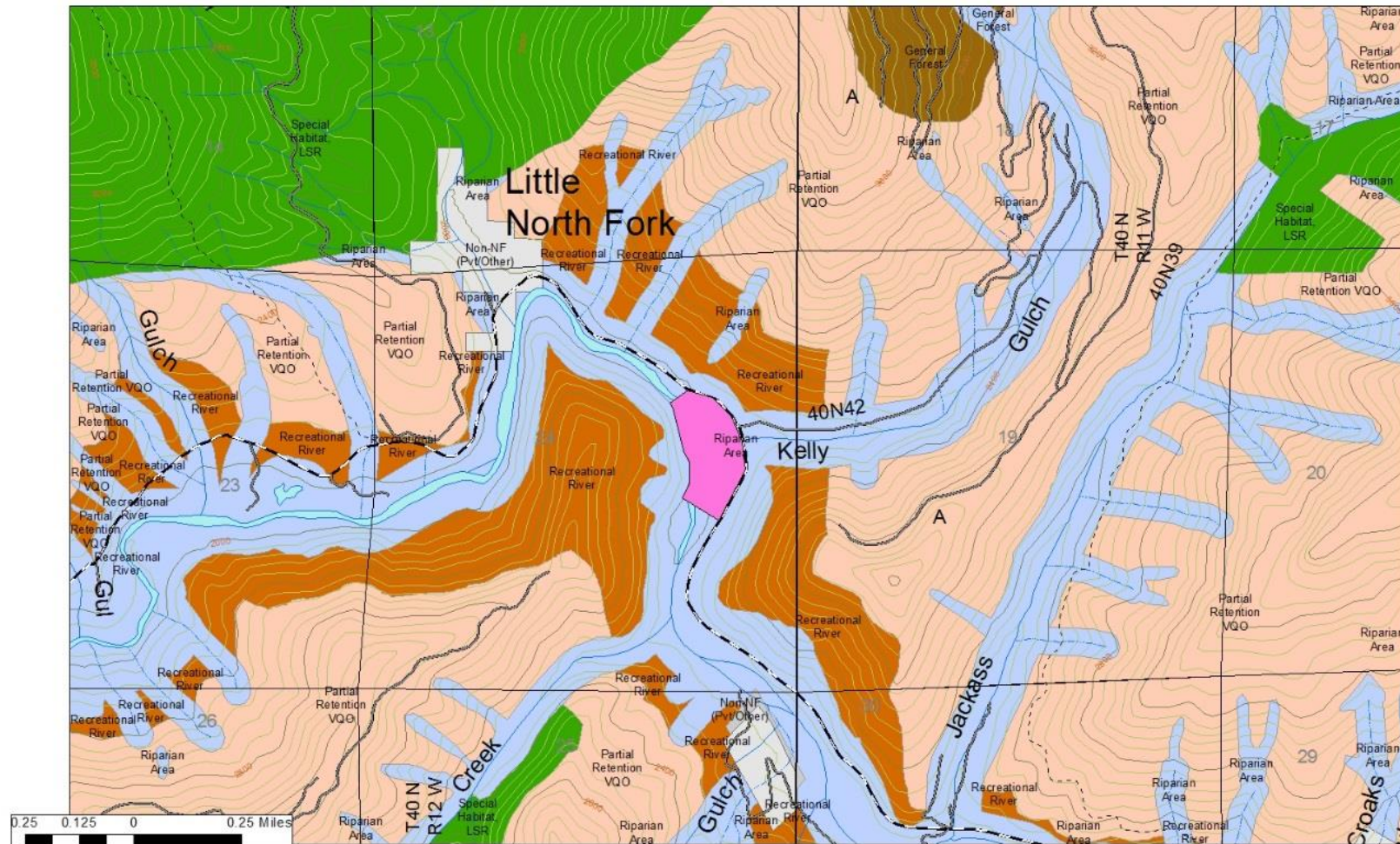


Figure 3: Management area map showing the project area relative to designated management areas.

Appendix B – Best Management Practices

Best management practices were developed to comply with Section 208 of the Clean Water Act. Best management practices have been certified by the State Water Quality Resources Control Board and approved by the Environmental Protection Agency as the most effective way of protecting water quality from impacts stemming from non-point sources of pollution. These practices have been applied to forest activities and application of the Region 5 USFS BMPs has been found to maintain water quality that is in conformance with the water quality objectives in the North Coast Regional Water Quality Control Board's (Control Board) Basin Plan

http://www.waterboards.ca.gov/northcoast/water_issues/programs/basin_plan/

Region 5 Forest Service best management practices have been monitored and modified since their original implementation in 1979 to make them more effective. Numerous on-site evaluations by the Control Board have found the practices to be effective in maintaining water quality and protecting beneficial uses.

The Klamath National Forest (Forest) monitors the implementation and effectiveness of best management practices on randomly selected projects each year. From 2000 to 2012, best management practice implementation requirements were met on 78 to 100 percent (91 percent average) of sites samples, and best management practice effectiveness requirements were met on 88 to 100 percent (94 percent average) of the sites sampled. The critical best management practice evaluation is *effectiveness* which is a field evaluation and determines how well the best management practice worked to prevent sedimentation. Best management practice implementation is an office evaluation and is not critical to the best management practices field performance. The success rate for effectiveness has been in the high eighties and nineties each year since 1993. Results of this monitoring can be found on the Forest (Fiscal Year 2012 Best Management Practices Report [USFS, 2013]).

Best management practices utilized by the Forest are listed in Appendix D of the Forest Plan (USFS, 1995). These basic best management practices are similar to those listed in the 2011 Region 5 Best Management update in Chapter 10 of the Soil and Water Conservation Handbook, which additionally includes a narrative and objective of each (USFS, 2011); where there are differences, direction is to employ the newer best management practice list.

The following list of best management practices would be implemented in the Kelly Bar Habitat Enhancement Project. A description of the objective of each best management practice is included, as well as how each practice would be specifically implemented within the project in regards to watershed-associated resources of fisheries, geology, hydrology, and/or soils. All other provisions of the best management practices would also be followed. For additional information on the best management practices and their objectives, see the Region 5 Soil and Water Conservation Handbook (USFS, 2011).

BMPs identified as specific mitigation through analysis of this Project:

- Work would be conducted during low flow conditions, with the minimal equipment necessary to implement the project.
- All construction work along the river channel and Kelly Gulch would be completed by October 15th, avoiding winter weather working conditions.
- Temporary crossings would be placed over the North Fork Salmon River and Kelly Gulch.
- Tree removal for equipment access/operation would result in no canopy shade loss over the North Fork Salmon River or Kelly Gulch.
- Most of the construction would occur out of the side channels, and the ponds would be dry. However, construction at the connection of alcoves would require isolation and dewatering of the alcove from the North Fork Salmon River.
- No fueling/refueling of mechanical equipment would occur within 100 feet of any flowing watercourse or intermittent drainage, and contour berms would surround equipment refueling areas in order to prevent surface water contamination through runoff. If a spill occurs, it would be reported and cleaned-up in accordance with applicable State and Federal laws, rules, and regulations. Vegetable oil or other biodegradable hydraulic oil would be used wherever possible in order to lessen the environmental impact of a leak.
- Mechanized equipment would be inspected for oil, grease, fuel, and other leakage prior to crossing the channel. If necessary, it would be cleaned in a designated area with suitable absorbent material. Absorbent material would be disposed of in an appropriate manner

BMP 1.4 – Use of Project Maps for Designating Water Quality Protection: Identify sensitive areas and water uses as part of the project contract to assist operators in locating water concerns and applying protection methods. This is accomplished during contract preparation and implemented during project operations.

- All protected locations would be illustrated on the site plans.
- Vehicle access points to the work site would be illustrated on the site plans.
- Staging areas would be illustrated on project maps and site plans.
- Water drafting, if necessary, would be from existing drafting sites and would be identified on project map.
- Temporary and permanent storage area for spoils would be illustrated on the site plans.

BMP 1.5 – Limiting Operating Period: To prevent soil compaction and erosion from operations during wet weather; and to ensure placement of erosion control structures prior to the onset of winter to reduce water quality impacts. This is accomplished during the project operations.

- The project is proposed to take place during the normal operating season (NOS) that is defined as August 1st to October 23rd. Activities would be restricted during periods of wet weather during the NOS.
- When there is a 30% chance of rain in the next 24 hours the Contracting Officer (CO) would be on site to ensure that erosion control procedures are implemented in a timely fashion and to initiate shutdown or resume operations. Operations would not resume until suitable weather, soil, and forecast conditions exist.

- The Klamath Wet Weather Operation Standards (WWOS) (USFS, 2002) would be used for all project activities.
- The WWOS would be used to guide operations during periods of wet weather. The CO would examine field conditions to determine when the soil and/or road has dried out enough to enable operations to resume. The project earth scientist or hydrologist may be called on to make recommendations to the CO who would provide direction to the Contractor as to when operations may resume to ensure that BMPs would be met and adverse impacts would be avoided.
- All ground disturbing project activities would be conducted during appropriate periods of weather and soil moisture to insure BMP attainment and the avoidance of adverse impacts to listed species. Forecast periods would also be of a suitable length to allow completion of the task undertaken before precipitation events occur.

BMP 1.8 – Streamside Management Zone (SMZ) Designation: Designate zones adjacent to water and/or riparian areas as zones of special management. This is accomplished during the planning and layout phase of the project.

- Sites for water drafting, if necessary, would be designated by the Forest Service and agreed to by the Contractor.
- Activities would occur during the least critical periods for water and aquatic resources: when streams are dry; during low-water conditions; and/or in compliance with spawning and breeding season restrictions. Low-water/dry conditions for the project area generally occur June through November, dependent upon snowpack and individual drainage characteristic. Consultation would be made with the District Fish Biologist or Hydrologist for timing in regards to specific sites.

BMP 1.13 – Erosion Prevention and Control Measures During Project Operations: Ensure that project operations shall be conducted reasonably to minimize soil erosion. This is accomplished during the pre-project design process, including consultation with project consultants/engineers, and throughout the operations phase of the project.

- Erosion control measures are discussed during the pre-project meeting with the Contractor and the Forest Service. They are updated throughout the operations phase of the project.
- The Klamath Wet Weather Operation Standards (WWOS) (USFS, 2002) would be used for all project activities.

BMP 1.19 – Streamcourse and Aquatic Protection (National BMP AqEco-2): Conduct management actions within these areas in a manner that maintains or improves riparian and aquatic values, provide unobstructed passage of stormflows, and control sediment and other pollutants entering streamcourses.

- All modifications to a streamcourse, including damage to banks and channels, shall be repaired to the extent practicable prior to project completion.
- All project generated debris shall be removed from the streamcourse, unless otherwise agreed to by the project implementation lead.
- Equipment use within the streamside management zone shall be limited to designated access routes.
- Project activities shall only be implemented during base flow conditions, so as to reduce the risk of introducing sediment to the stream course or disrupting salmonid spawning.
- Project activities shall be coordinated with the appropriate State and Federal agencies.

- The project design and plan shall incorporate Clean Water Act (CWA) 404 permit requirements and other Federal, State, and local permits/requirements. Project implementation shall not begin until required permits are obtained.
- The work zone shall be clearly delineated.
- All project equipment shall be inspected prior to arriving at the project site. It shall be well maintained, clean of aquatic invasive species, as well as oil and grease.
- Vegetable oil or other biodegradable hydraulic oil shall be used wherever possible.
- The number of access routes, and equipment entry into or across the stream channel, shall be minimized as much as possible.
- Erosion control measures shall be promptly installed and appropriately maintained.
- Materials brought to the site (e.g., plants, seed, rock) shall be free of toxins and invasive species.
- Implementation monitoring by Forest fisheries and watershed personnel shall occur in order to identify necessary corrections to work quality and/or materials.
- Effectiveness monitoring by Forest fisheries and watershed personnel shall occur in order to evaluate the success of the project in meeting design objectives and avoiding unacceptable impacts to water quality.

BMP 1.20 – Erosion Control Structure Maintenance: To ensure that constructed erosion-control structures are stabilized and working.

- The Contractor would maintain, inspect, and repair erosion-control structures at project site. A status and repair log would be kept.

BMP 2.5 – Water Source Development and Utilization: To supply water for road construction, maintenance, dust abatement, fire protection, and other management activities, while protecting and maintaining water quality.

- Road approaches would be armored, as necessary.

Fish-Occupied (Anadromous) Water

The designated project drafting site is within a Pacific salmonid-bearing stream reach. Therefore, *NOAA Fisheries Water Drafting Specifications* guidelines would be used. They include, but are not limited to, the following:

5. When in habitat potentially occupied by Chinook and Coho salmon, intakes would be screened with 3/32-inch mesh for rounded or square openings, or 1/16-inch mesh for slotted openings. When in habitat potentially occupied by steelhead trout, intakes would be screened with 1/8-inch mesh size. Wetted surface area of the screen or fish-exclusion device shall be proportional to the pump rate to ensure that water velocity at the screen surface does not exceed 0.33 feet/second.
 - b. Use of a NOAA approved fish screen would ensure the above specifications are met.
6. Fish screen would be placed parallel to flow.
7. Pumping rate would not exceed 350 gallons-per-minute (gpm) or 10% of the flow of the anadromous stream drafted from.
8. Pumping would be terminated when tank is full.

In general, *NOAA Fisheries Water Drafting Specifications* are more strict and specific than those provided by BMPs, and thus take precedence. Additional applicable requirements as specified by the BMP includes:

- Water drafting by more than one truck shall not occur simultaneously.

BMP 2.10 – Parking and Staging Areas (National BMP Road-10): Ensure parking and staging areas shall not impact water quality through runoff.

- Parking, staging, and refueling areas shall be located to avoid sensitive areas such as riparian areas, wetlands, meadows, bogs, fens, inner gorges, overly steep slopes, and unstable landforms to the extent practicable.
- The size of parking, staging and fueling areas shall be minimized.
- Signage shall clearly indicate parking, staging and fueling areas.
- Parking, staging, and fueling areas shall be located upon existing road pull-outs and similar wherever possible.
- Upon project completion, and where necessary, parking, staging and fueling areas shall be rehabilitated through decompaction, grading/contouring, mulching and/or planting.

BMP 2.11 – Equipment Refueling and Servicing (National BMP Road-10): Prevent fuels, lubricants, cleaners, and other harmful materials from discharging into nearby surface waters or infiltrating through soils and to contaminate groundwater resources.

- No fueling/refueling of mechanical equipment would occur within 100 feet of any flowing watercourse or intermittent drainage.
- Petroleum and chemical delivery and storage facilities shall be located and maintained consistent with local, State and Federal regulations.
- Contour berms shall surround equipment refueling areas in order to prevent surface water contamination through runoff. Liners shall be used to prevent groundwater contamination through seepage through the soil. The measures shall be promptly installed at the start of the project and maintained throughout implementation.
- Project implementation personnel shall be trained on proper fuel and chemical storage, handling, and disposal.
- Excess chemicals or wastes shall not accumulate or be stored within the project area.
- Upon project completion residues, waste oil, and other materials shall be promptly removed from National Forest System land and properly disposed of.
- Should a spill occur, it shall be reported and cleaned-up in accordance with applicable State and Federal laws, rules and regulations. The Forest hazardous materials coordinator's name and phone number shall be available to personnel who administer or manage activities utilizing petroleum-powered equipment.
- Should a spill occur, contaminated soil and other material shall be promptly removed from National Forest System lands and disposed of in an appropriate manner.
- Should a spill occur, the Forest shall notify the State Water Board.
- Should a spill which may affect listed aquatic species occur, NOAA Fisheries shall be notified for emergency consultation.

BMP 5.6 – Soil Moisture Limitations for Mechanical Equipment Operations: Prevent compaction, rutting, and gullyng, with resultant sediment production and turbidity.

- The Klamath National Forest Wet Weather Operation Standards shall be followed during implementation of the project at all sites.
- Outside of areas where groundwater is intersected to meet project objectives, equipment shall not be operated when ground conditions are such that excessive damage shall result to the soil resource. This includes observations of soil smearing, oozing, and/or caking on tracks/tires/boots, and/or rutting (4+ inches deep). These conditions are indicators of excessive damage through the destruction of the original soil structure.

BMP 7.1 – Watershed Restoration: To repair degraded watershed conditions, and improve water quality and soil stability.

- Proposed action is for purposes of watershed restoration.

Appendix C – Aquatic Conservation Strategy Objective Analysis

The Klamath National Forest Land and Resource Management Plan contains the components, objectives, and standards and guidelines for consistency of projects with the Aquatic Conservation Strategy. The Record of Decision for the Klamath National Forest – Forest Plan (USFS, 1995) is the guiding document for Forest projects; the Klamath National Forest Record of Decision incorporates the aquatic conservation strategy standards and guidelines from the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within The Range of the Northern Spotted Owl (commonly known as the Northwest Forest Plan) (USFS, 1994).

The following rationale was developed to inform the decision maker for the Kelly Bar Habitat Enhancement Project in making the aquatic conservation strategy consistency findings. A description of the existing watershed conditions, including important physical and biological components, is located in the following applicable specialist reports: Water Quality, Geology and Soils, Aquatic Resources, Wildlife, and Botany.

The Klamath National Forest – Forest Plan lists four components of the aquatic conservation strategy, as stated on pages 4-25 through 4-27 of the Klamath National Forest – Forest Plan: "1) Riparian reserves, 2) Key watersheds, 3) Watershed analysis and 4) Watershed restoration" (USFS, 1995). The four components of the aquatic conservation strategy are designed to operate together to maintain and restore the productivity and resiliency of riparian and aquatic ecosystems (USFS, 1994).

Riparian Reserves:

- The relevant Riparian Reserve width for the project area is specified in the Forest Plan (USFS, 1995) as two site potential tree heights from each side of a fish-bearing waterway (USFS, 1995, Appendix J 1-2). Within the North Fork Watershed Analysis area, one site potential tree averages about 170 feet. Therefore, the width of the Riparian Reserve is a minimum of 340 feet on each side of a waterway within the project area.

Key Watershed and Watershed Analysis:

- Key Watershed – Salmon River, inclusive of:
 - North Fork Salmon River 5th-field watershed (HUC 1801021002)
 - Shiltos Creek – North Fork Salmon 7th-field watershed (HUC 18010210020706)
- Relevant Watershed Analysis
*North Fork Watershed Analysis (USFS, 1995)

Watershed Restoration:

- Project is a restoration action

Aquatic Conservation Strategy Objective 1: *Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.*

Evaluation of watershed complexity in regards to this project is primarily a consideration of effects to off-channel habitat associated with the creation and enhancement of high-flow and thermal refugia.

Background – The North Fork Salmon River has degraded habitat complexity as a result of historical unrestricted stream clearing, logging, and mining. Within the project area, large portions of the alluvial bars have been reworked by historic placer mining and dredging. Kelly Bar and West Bar currently consist mostly of large, barren alluvial floodplain with several sparsely vegetated, discontinuous, remnant high-flow side channels and vegetated alluvial terraces. The high-flow side channels, as well as the two ponds on Kelly Bar, are largely dry throughout the summer and fall. These off-channel areas are currently considered to be marginal habitat for Southern Oregon/Northern California Coast (SONCC) coho and other salmonids.

Determination – Maintain and Restore – The Proposed Action would restore the distribution, diversity, and complexity of watershed and landscape-scale features for aquatic systems within the project area (i.e., at the site scale), but would maintain these components at the greater landscape (i.e., 5th- and 7th-field watershed) scale.

The Proposed Action would increase the abundance of habitat complexity within the project area by (a) creating self-sustaining side channels with backwater alcoves for high-flow off-channel refugia, (b) providing off-channel high-flow and thermal refugia using groundwater-fed ponds and exploiting hyporheic flows in alcoves, (c) increasing in-channel bed complexity using small and large wood features, and (d) creating small and large wood complexity in off-channel habitats.

The Proposed Action would lead to localized long-term improvement in the distribution, diversity, and complexity of watershed features, thereby benefitting the Shiltos Creek – North Fork Salmon 7th-field watershed. The purpose of the project is not to fully restore the watershed, but rather to create an increased degree of site-specific functionality in regards to complex off-channel rearing and spawning habitat. The small scale and scope of the project would not change the existing condition of the 5th-field watershed.

Aquatic Conservation Strategy Objective 2: *Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.*

Watershed connectivity takes into consideration the effect to passage of aquatic species, fish, and riparian-dependent terrestrial species within the project area and the larger 5th- and 7th-field watersheds. Abiotic connectivity (e.g., wood and sediment regimes) may also be discussed.

Background – The Kelly Bar and West Bar floodplains are classified as confined vertical accretion floodplains, which are typically found in confined valleys with laterally stable channels and floodplains. The floodplains are shaped by extreme events and experience fine-grained vertical accretion and revegetation between flow events, allowing the bars to persist over long periods of time between events. The segment of the North Fork Salmon River adjacent to the

project area can inundate its floodplain as appropriate given a particular discharge, despite localized impacts associated with historical mining practices on Kelly Bar. Kelly Bar and West Bar likely become inundated – with water spreading from valley wall to wall – at larger than 10-year events.

Roads which have been constructed upon the landscape for timber and minerals extraction, and which are currently in use for recreational purposes, disrupt watershed network connections and can affect the life histories of aquatic- and riparian-dependent species by altering natural channel pathways for surface flow. There is a culvert on Kelly Gulch that is located at the crossing of Forest Road 40N39. This barrier represents the upstream limit of fish (~1.25 mi from the mouth of Kelly Gulch), but it is outside of the project area footprint. The amount of accessible rearing habitat for juvenile salmonids up-migrating from the North Fork Salmon River is uncertain as several potential barriers (~5 ft high bedrock falls/cascades) are present between the mouth and the culvert. At least 0.5 miles of habitat currently unoccupied by fish is present above the culvert. There are plans to replace the culvert with an open bottom arch that would not obstruct fish passage, but that action is not associated with the current project.

Determination –Maintain and Restore – The Proposed Action would maintain spatial and temporal connectivity within the 5th- and 7th-field watersheds for aquatic- and riparian-dependent species; localized enhancement of connectivity between watersheds would be improved (but not fully restored) by project actions.

Under normal conditions, spatial and temporal connectivity between the 5th-field mainstem system of the North Fork Salmon River and the local 7th-field Shiltos Creek – North Fork Salmon watershed is impaired by impacts of historical mining operations. As part of the Proposed Action, a channel would be excavated in order to connect Kelly Pond directly to the North Fork Salmon River. The Proposed Action would also restore seasonal flows into several discontinuous high-flow side channels that are contained within the active floodplain but which are currently inundated only annually or semi-annually.

The Proposed Action might provide a slight improvement in subsurface groundwater retention within the floodplain resulting from the placement of wood structures, but it would be highly localized within the project area. Any improvement would still be within the normal variability and therefore the project would not change the existing condition of the 5th-field and 7th-field watersheds that encompass the project area. Importantly, however, certain project features (specifically the alcoves, Kelly Pond, Willow Pond, and the Kelly Pond Outfall Channel) would be excavated to a depth sufficient to allow them to receive groundwater inflows, thereby enhancing the connection between groundwater and surface water within the floodplain.

Aquatic Conservation Strategy Objective 3: *Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.*

Aquatic systems integrity considers effects to channel geomorphology and includes evaluations of road density, hydrology connectivity of road systems, and direct impact to bank and stream bottom.

Background – The streambanks of Kelly Gulch and the North Fork Salmon River have been compromised from the pre-settlement state due to human-mediated impacts, including channelization, presence of tailing piles, and other legacy mining effects. Within the 7th-field watershed, Kelly Gulch is considered to have moderate to high channel stability, but as with other Salmon River tributaries, a downed tree or small landslide may impact bank, shore, and bottom

configurations. Within the project area (i.e., on Kelly Bar), abundant large cobbles from historical mining practices have actually increased bank stability of Kelly Gulch, with effects from dynamic river action prevented except for during extreme flows. Floodplain substrate has been over-coarsened and therefore is less mobile than it would have been pre-settlement, it is currently locked in place (except for during catastrophic flooding).

Determination – The Proposed Action **does not prevent attainment** of this aquatic conservation strategy objective. – The Proposed Action would maintain the physical integrity of the aquatic system, including streambanks, shorelines, and channel bottoms.

The Proposed Action is expected to cause short-term, localized reduction in streambank stability of Kelly Gulch and the adjacent North Fork Salmon River particularly as a result of installation and removal of temporary crossings, as well as removal of riparian vegetation. During and immediately after construction, streambanks within the project area may be more prone to erosion. However, stabilization would occur as vegetation re-establishes in the months and years post-implementation. In the long-term, bank stability would likely be similar to the current condition, with localized improvements expected as a result of diverse riparian planting.

The Proposed Action would mostly maintain the existing condition of physical integrity of the aquatic system of the 7th-field watershed, although minimal, localized improvement to the bottom configurations within the high-flow side channels is expected.

The Proposed Action would not affect the bottom configuration of Kelly Gulch or the North Fork Salmon River; however, the installation of habitat structures would stimulate the development of localized scour holes within the side channels on Kelly Bar and West Bar. Under the existing condition, there is a deficiency in pool frequency and quality as well as large diameter wood accumulations within the project area. The increase in pool and slower water habitat would possibly result in accumulated spawning gravels as they collect in pool tail-outs, and might locally increase the availability of suitable spawning habitat. The side channels are largely dry throughout the summer and fall and currently do not provide suitable spawning habitat for salmonids.

Aquatic Conservation Strategy Objective 4: *Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.*

The Salmon River in the project area is listed as impaired by the California State Clean Water Act 303(d) list for stream temperature. Tributaries, unless specified otherwise, are included in the listing of their primary "mainstem" system. Water quality analysis would primarily focus on temperature (with stream shade as a proxy, where applicable). Stream sediment is addressed by Objective #5 and is therefore excluded from the discussion of this objective.

Background – Groundwater and surface water temperatures were monitored within the project area in 2014 and 2015. During the monitoring period, groundwater temperatures along Kelly Bar were lower than river temperatures in the summer months, but remained warmer than the river as it cooled in the fall, which is the optimum pattern for off-channel coho rearing (Lestelle, 2007). Surface water temperatures in Kelly Gulch and Kelly Pond followed a similar pattern as the groundwater temperatures, remaining lower than river temperatures in the summer months, but higher during winter months. Although the North Fork Salmon River is impaired for water

temperature, temperatures within Kelly Bar have been found to be suitable year-round for juvenile rearing.

Stream shade has not been assessed for the project area (i.e., for Kelly Gulch). Where human-induced shade loss occurs, there is the potential for stream temperature to be elevated above the expected range.

Determination – Maintain and Restore – In the short term, the Proposed Action may insignificantly increase stream temperature. In the long term, water quality is expected to improve beyond the current condition, with decreased temperatures.

Waterbodies within the project area could experience an insignificant, short-term increase in temperature if the removal of riparian vegetation results in a reduction of effective shade. However, minimal canopy shade loss is anticipated as a result of project implementation, and the disturbance to vegetated riparian areas is estimated to be 0.25 acres, most of which does not provide effective shade to waterbodies within the project area. Due to the minimal extent of vegetation removal, any detrimental impact to water temperature would be localized and minor, and likely indiscernible from natural variation. Residual effects would diminish within two to three years as riparian vegetation reestablishes and grows large enough to provide effective stream shade.

In the long-term, the Proposed Action is expected to have a beneficial effect on the temperature of waterbodies within the Kelly Bar/West Bar project area. Extensive planting of diverse riparian vegetation would result in an increase of shade from the current condition, and hyporheic flow would be maintained longer into the water year, potentially creating localized but biologically valuable thermal refuge. Shade to the North Fork Salmon River would not be affected by the Proposed Action and therefore there would be no change in temperature in the mainstem system.

In summary, the Proposed Action would maintain and restore water quality at the site scale, and would not prevent attainment of this objective at the 7th-field and 5th-field watershed levels.

Aquatic Conservation Strategy Objective 5: *Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.*

The Salmon River in the project area is not listed as impaired for sediment by the California State Clean Water Act 303(d). Sediment regime primarily focuses on Cumulative Watershed Effects modeling, which employs three sediment models: Equivalent Roaded Area, a mass wasting model, and a hill slope soil erosion model). Other measures are used when applicable.

Background – Cumulative Watershed Effects modeling for the Shiltos Creek – North Fork Salmon 7th-field watershed shows that the total current modeled risk ratio of potential soil loss into stream systems (USLE model) is 0.69; the mass-wasting risk ratio (GEO model) is 0.67; and the Equivalent Roaded Area (ERA) risk ratio, which indicates the potential for sediment delivery from disturbed areas within the watershed, is 0.16. The models indicate that there are management-related factors that are increasing the risk of sedimentation. Such factors are likely a degrading road system, past timber harvest, and the 2013 Salmon River Complex, which burned a small portion of the 7th-field watershed. However, the modeled risk ratios are well below the threshold of concern (TOC), which would be a risk ratio of 1.0. TOCs are points beyond which there is increasing susceptibility for significant adverse cumulative effects within a watershed (Bell 2012). Project impacts were not evaluated using the Cumulative Watershed Effects models

because the effects of project alternatives would not result in a disturbance large enough to be detected by the model. No streambed sediment data are available for Kelly Gulch.

Determination – The Proposed Action does not prevent attainment of this aquatic conservation strategy objective. – The Proposed Action would maintain the local sediment regime in regards to timing, volume, rate, and character of sediment input, storage, and transport on the local level. Although there may be a short-term negative impact to sediment, long-term effects of the project would be neutral.

The risk of potential for increasing sedimentation is approximated by ERA acres. An excess of 60 acres of development related to roads would cause the 7th-field watershed to exceed the TOC of 1.0 for the ERA model. An exceedance of the TOC does not necessarily mean that adverse effects would occur; rather, it is an indication that the risk (likelihood) of adverse effects is high. The Proposed Action would not require the construction of temporary access routes; one existing access route would be used, and equipment access to site features would be on cobble. Therefore, ERA acres would not be increased by the Proposed Action.

Best Management Practices (BMPs) would reduce the potential for mobilization of sediment (see Appendix B for the full list of project BMPs). Turbidity and the mobilization of fine sediments are most likely to occur during and immediately following project activities, especially following storm events during the first winter. Therefore, it is assumed that there would be a temporary increase in human-caused sediment input in the form of silt and sand mobilization into the North Fork Salmon River. The elevation of turbidity during storm events would be short-term, returning to baseline by the first year post-construction, if not sooner. Similarly, while there may be an insignificant to unmeasurable exportation of fine sediment, it would not alter the current substrate composition of the North Fork Salmon River and would not be outside of natural variability. The occurrence of fine sediment mobilization would decrease as riparian vegetation regrows on Kelly Bar and West Bar. Importantly, wood structures and slower water habitat would facilitate sediment deposition and sorting throughout the project area.

Aquatic Conservation Strategy Objective 6: *Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.*

Water quality discussion primarily considers the effect to base flow using a qualitative assessment and peak flow.

Background – The historical range of variability for base and peak flow for waterways in the project area spans from 100-year flood events like the flood of 1964 to drought years where the snow pack is less than 10% of normal. On an annual basis, spring-fed perennial streams have less variation in their base flows than snow-melt driven intermittent streams. Large fires can increase peak flows because of reduction of plants which uptake water, and decrease in precipitation interception and roughness that slow the water on the hillslope. There are no noteworthy diversions in the project area.

Determination – The Proposed Action does not prevent attainment of this aquatic conservation strategy objective. – The Proposed Action would not affect the timing, magnitude, duration, and spatial distribution of peak, high, and low flows. However, more consistent flows would be restored to side channels, and enhanced complexity would slow stream velocity. This may increase the amount and residence time of hyporheic flow, but contributions to subsurface

groundwater retention would be minimal and localized around the wood structures. The Proposed Action would not affect overall flows on the reach, 7th field, or 5th field watershed level.

Aquatic Conservation Strategy Objective 7: *Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.*

Flow regime considers effects to the potential inundation of floodplains in the project area.

Background – Floodplain inundation is a natural process that recharges groundwater, decreases stream power in storms, and facilitates beneficial deposition of fine sediments, which stimulates a thriving riparian vegetation community. High flows also naturally increase watershed complexity by modifying stream banks and gravel bars. Portions of the floodplain are inundated every year or two, but neither Kelly Bar nor West Bar becomes fully inundated, with water spreading from valley wall to wall, until larger than a 10-year event occurs. Within the project area, the floodplain has been reworked by historical placer mining and dredging, which has reduced connectivity to existing off-channel habitat by coarsening floodplain sediments and surfaces as well as causing localized incision of the main channel.

Determination – Maintain and Restore – The Proposed Action would not affect floodplain inundation; current timing, variability, and duration of floodplain inundation in the 5th-field and 7th-field watersheds would be maintained. However, floodplain connectivity within the project area would be improved in both the short- and long-term.

In the short-term, hydrological linkage between the main channel and off-channel areas would be enhanced and processes that maintain wetland functions, riparian vegetation, and succession would be facilitated. In the long-term, the project would reduce the potential for future degradation of floodplain connectivity resulting from channel incision by decreasing sediment transport capacity through the project area.

Aquatic Conservation Strategy Objective 8: *Maintain and restore the species composition and structural diversity of plant communities in riparian reserves and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.*

Species composition and structural diversity considers the expected response of conifer and hardwood trees in Riparian Reserves. Discussion would include coarse woody debris on the hillslopes. Sediment regime, bank stability, and instream wood elements have previously been discussed (see Objectives 1, 3, and 5).

Background – The composition of vegetation is influenced by elevation. Upper elevations (above 5,000 feet) are typically dominated by red fir. Conversely, stands blend into the mixed conifer timber type at lower elevations, dominated by Douglas fir. Structurally, there has been a departure from historic condition as a result of extensive timber harvesting between the 1950s and 1990s: the vast majority of overstory has been removed, and the landscape is largely lacking in pole and medium/large conifer stands, which have been replaced by a smaller conifer class.

Little quantitative data is available regarding the historic range of variability of coarse woody debris (i.e., terrestrial downed wood). The sources of large coarse wood have been reduced from historical conditions by commercial harvest and altered fire regime. In the past, frequent wildfires would have contributed to well-distributed coarse woody debris by creating snags that eventually fall, thereby recruiting to the hillsides and other terrestrial environments.

Within the project area footprint, conifers are present on the eastern portion of Kelly Bar. Both Kelly Bar and West Bar were scoured during the 1964 flood event, but are becoming re-established with alder and willow.

Determination – Maintain and Restore – The Proposed Action would maintain species composition and structural diversity of plant communities in Riparian Reserves at the greater landscape scale. Within the project area, diversity would be enhanced and species composition would more closely reflect pre-disturbance conditions.

In the short-term, the Proposed Action would cause an insignificant detrimental effect to vegetation due to removal of small willow shrubs, immature cottonwood, and other native species as restoration treatments are implemented (e.g., alcove construction, pond enhancement, etc.). Diverse riparian planting of native vegetation would occur along the channels on Kelly Bar and West Bar. As vegetation regenerates and new plantings become established, post-construction surface erosion would decrease, effective shade would re-establish, and streambanks are expected to stabilize. The time horizon for re-growth of riparian vegetation is months to years, depending upon the plant species. There would be no long-term change in the species composition or diversity of Riparian Reserves at the 5th-field and 7th-field watershed scales, but localized enhancement of riparian vegetation on the river bars would cause such areas to trend toward pre-disturbance conditions.

Aquatic Conservation Strategy Objective 9: *Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.*

Discussion regarding this objective considers the effect of the Proposed Action upon the quantity and quality of Riparian Reserve habitat for riparian-dependent animal and plant species, including the risk of spread of noxious weeds.

Background – Historically, near-stream vegetation was likely a mix of conifer, cottonwood, willow, and alder; the edges of the riparian zone transitioned to the large conifers representative of old-growth forest. Site- and reach-level character could experience modification and reset to an earlier seral state as a result of flood scour and debris flows. Logging and mining activities, as well as changes to the fire regime, have altered the Riparian Reserve condition, and non-native noxious weed species have been introduced in places. The subsequent effect to native plants and animals within the project area is unknown, but current distribution is likely similar to historical. (See Objective 2 for discussion about watershed connectivity.)

Determination – Maintain and Restore – The Proposed Action would maintain, in both the short- and long-term, the quantity and quality of habitat for riparian-dependent/aquatic animal and plant species at the 5th-field and 7th-field watershed scales. Benefits to habitat are expected in the long-term throughout the project area because enhanced off-channel habitat complexity would create year-round rearing habitat by providing both high-flow and thermal refugia; large wood complexity and small woody debris would provide cover and food sources for juvenile salmonids. Such enhancement, along with diverse riparian vegetation, would provide habitat to multiple species of riparian-dependent wildlife, including neotropical migratory birds.

The overall benefit to Riparian Reserve habitat is insignificant at the landscape level due to the small footprint of the project and the confounding influence of past natural and anthropogenic events. The Proposed Action would therefore enhance but not fully restore the ability of Kelly Bar, West Bar, and the adjacent North Fork Salmon River to support well-distributed populations of native species. Project Design Features have been incorporated into the Proposed Action to reduce the risk of introducing or spreading noxious weeds.

Appendix D – Actions Considered for Cumulative Effects Analysis

The interdisciplinary team used the Schedule of Proposed Actions and the Bureau of Land Management's mining claim database to determine the on-going and reasonably foreseeable future actions to consider for the cumulative effects analysis. The Shiltos Creek-North Fork Salmon River 7th field watershed was the spatial boundary for consideration based on the needs identified by the interdisciplinary team. The present and reasonably foreseeable future actions that are considered for cumulative effects analysis may vary by resource (see chapter 3 and resource reports for resource-specific details).

Jess Project (Planning stages complete, implementation has not been completed). The Salmon/Scott River Ranger District of the Klamath National Forest proposed the Jess Project to improve defensibility against wildfire to the municipal watershed and nearby communities and to improve compositional, structural, and functional attributes of biologically diverse forest ecosystems by restoring ecological processes that build resiliency to high-intensity wildfire and insect and disease infestation, and to provide a broad range of ecosystem services. The selected alternative proposes to implement ridge top fuels treatments, commercial silvicultural treatments, non-commercial silvicultural treatments, roadside fuels treatment, and meadow treatments.

There were two active mining claims identified in the mining claims database for the analysis area. The location is described using quarters of a township and range section. Because of the imprecise location information in the database it was difficult to distinguish the exact location of the entire boundary of each claim. However, the boundary within the project area is determined by on the ground markers and signage. The mining claims are placer (mining in river sediment) and neither of the mines have a Plan of Operations. This means that only exploratory activities are being performed such as gold panning, the excavation of small test holes for prospecting, and small-scale processing of the mined material.

An undersized culvert on Kelly Gulch (Forest Road 40N39) creates a fish migration barrier. However, it is near the natural upstream limit of fish in the drainage. Fish habitat in the Gulch continues for another 1.25 miles, but is of low- to moderate-quality; thus, the culvert is a relatively minor deficiency given its location upon the landscape.

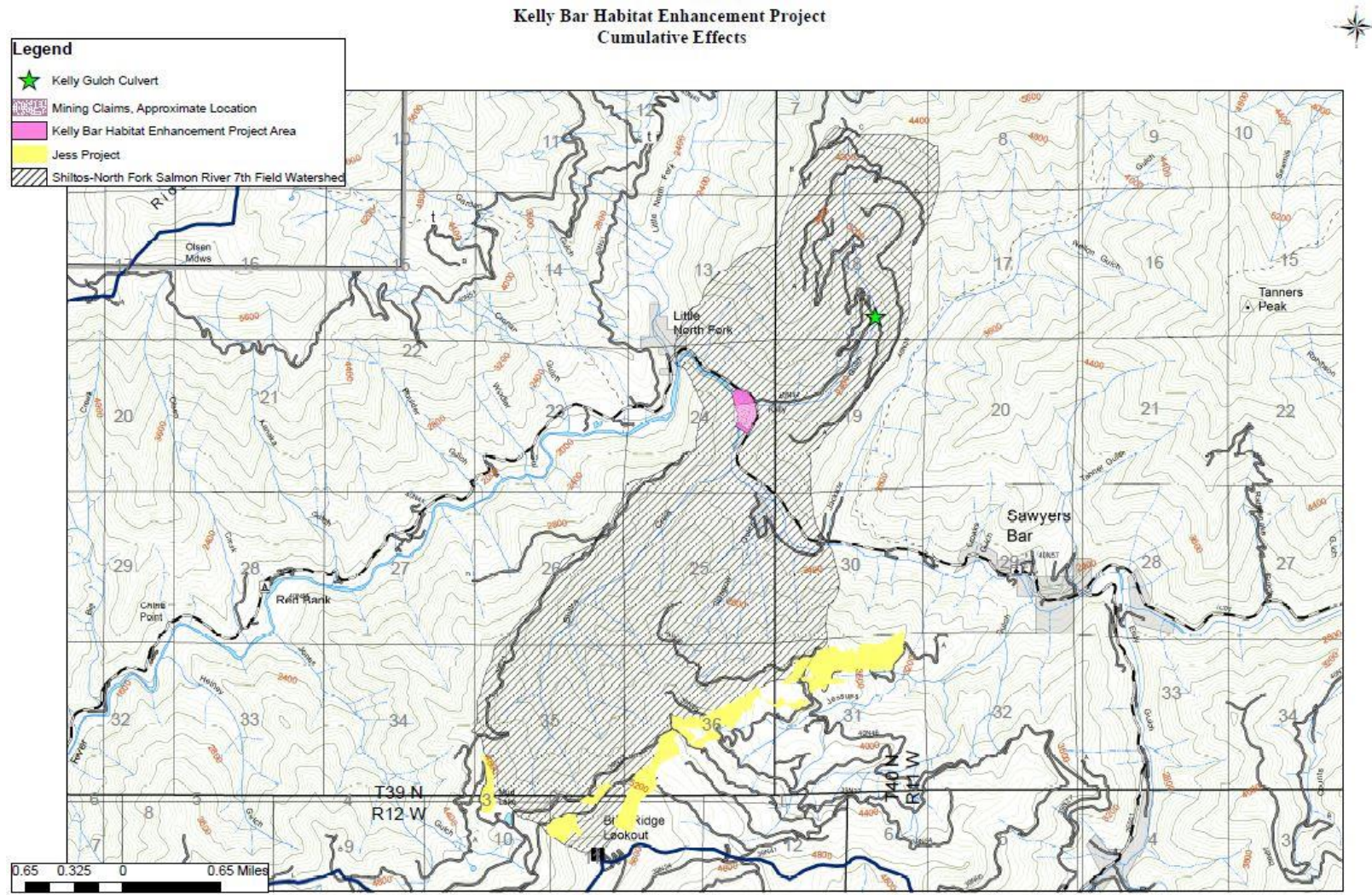


Figure 4: Map of actions considered for cumulative effects.

Appendix E – Response to Comments on the Kelly Bar Habitat Enhancement Project

This appendix is a summary of public comments received on the *Kelly Bar Habitat Enhancement Project Environmental Assessment*. The proposal was posted on the Forest website and first listed in the Schedule of Proposed Actions on October 1st, 2017.

Public Scoping Period

On October 13th, 2017, the proposal was mailed to nearby landowners or claim owners, to four tribes, the United States Fish and Wildlife Service, the National Marine Fisheries Service, Siskiyou County, and to the North Coast Regional Water Quality Control Board for a 15-day public scoping period from October 19th, 2017 to November 2nd, 2017. All comments received during the 15-day scoping period have been reviewed and responses are included herein.

A total of one comment email was received from one interested individual (see below). Comment documents were tracked upon receipt to assure all comments were captured. The exact wording of the comment is included in this appendix. Supporting documents referenced in the response can be found in the project record.

Comment 1, [October 30, 2017], from Dean McBroom, nearby landowner

Kelly Bar Habitat Enhancement Project:

Comments: We oppose any and all disturbance in channel or riparian areas within the hereditary Shasta domain.

Kelly in particular has seen too much disturbance already with gravel pits, water systems, septic systems, houses, mobile homes, channel alterations, even a proposed airstrip, in addition to total Doodle Bug dredge mining.

The river has healed itself and should be left that way. Continued disturbance will NOT be productive for fisheries or anything else.

As past projects: logs, boulders, channel alterations, planting or any other "Habitat Projects" have shown on the Salmon the river heals itself. Leave it alone!

Contact me for information as you see fit.

Response: The Kelly Bar Habitat Enhancement Project aims to restore the degraded floodplains of Kelly Bar and West Bar, which were altered by historic mining practices that have left the floodplain devoid of complex rearing and spawning habitat for anadromous fisheries within the project area. The legacy impacts to the floodplain within the project area inhibit natural recovery and require intervention to recover within human and anadromous fisheries population time scales. Restoration actions proposed in this EA aim to enhance fisheries habitat, including:

- Creating self-sustaining side-channels with off-channel alcoves for high-flow off-channel refugia,
- Providing off-channel high-flow and thermal refugia using groundwater-fed ponds and exploiting hyporheic (i.e., groundwater just under the surface of the floodplain which interacts with surface flows) flows in alcoves,
- Increasing in-channel bed complexity using large wood features,
- Creating large wood complexity in off-channel habitats,
- Increasing riparian shading to reduce summer water temperatures, and
- Improving connectivity of Kelly Gulch with the river for fish ingress and egress.

Based on the results of geomorphological assessment and hydraulic analysis, the project would enhance existing slow water side channels, create self-maintaining alcoves at the downstream ends of the side channels, and convert two seasonal ponds to cool water perennial ponds. Those features would be further enhanced by the installation of large wood features which would facilitate geomorphic processes and create side channel habitat. Additionally, diverse riparian planting would result in increased shade, direct flows to enhance side channel stability, capture fine sediment for further vegetation recruitment, and result in future large woody debris. The combination of which would greatly increase river access to the floodplain and increase off-channel habitat complexity within the project area (see Water Quality Resources Report).

The enhanced off-channel habitat would create slow water rearing habitat and thermal refugia for juvenile salmonids; with large wood features and revegetation providing cover and food sources. It would also create sorted gravel and refugia for spawning salmonids during high fall or winter flows. Enhancing these off-channel areas would meet Forest Plan Aquatic Conservation Strategy Objectives by aiding the recovery of fish habitat, riparian habitat, and water quality (6-46). The lack of habitat complexity, inherent in much of the Salmon River, is currently limiting the potential for the recovery of coho and spring Chinook salmon and other anadromous fish populations in a watershed that has tremendous potential for providing a long-term refuge for such species as climate change progresses. The proposed project would result in improved habitat complexity during all life stages of the salmonid life cycle through implementing a diverse range of constructed log features, revegetation, and enhanced side channels, ponds, and alcoves, which would interact with the floodplain in a wide range of stream flows (see Fisheries Biological Evaluation Report).

The North Coast Regional Water Quality Control Board and US Environmental Protection Agency have listed the Salmon River as impaired due to elevated water temperatures. The Salmon River Temperature Total Maximum Daily Load (TMDL) and Implementation Plan was prepared to reduce the temperature issues in the watershed over the long-term (NCRWQCB, 2005). By enhancing riparian vegetative shading and increasing hyporheic flow, this project would cool flows into the North Fork Salmon River, benefiting both anadromous fisheries recovery and TMDL implementation goals.

The project would occur entirely within the 100-year floodplain and has undergone archaeological review to ensure no cultural resources are impacted by project implementation. Outreach to the Shasta Nation, the Karuk Tribe, and other community members would be ongoing to ensure the planning process is transparent and based upon objective information.

This project was developed following years of fisheries monitoring and a riparian assessment completed in 2008. The site was identified as a high priority for restoration of riparian conditions and salmonid habitat through a planning process completed by Pacific Watershed Associates in 2012. The project was then reviewed and fully supported by the Salmon River Technical Advisory Committee, a diverse group of community and agency stakeholders. Following resounding support of the project, the SRRC initiated fully engineered designed plans, based on a year of water monitoring and in-depth site characterization. The plans were developed to meet Chapter VII of the California Department of Fish and Wildlife Habitat Restoration Manual (Flossi et al., 2010) and the current standards and practices of the industry, which have advanced quite a lot since restoration treatments were first tried on the Salmon River in the 1980s. This project was developed and designed with a diverse team of specialists and agency stakeholders, using the most current and best practices and standards for instream restoration by a design firm (Michael Love and Associates) with a wealth of experience and success in this field.

Additionally, extensive restoration effectiveness monitoring would be conducted for this project. This would allow us to gain valuable insight into how specific features of the project perform and provide refugia for fisheries. In the event that items of concern arise, consultation with the project team members, and/or other agencies, would occur in order to determine if a maintenance action is warranted.

Public Comment Period

On June 29th, 2018, the 30-day public comment period was initiated. Notice of the 30-day public comment period was mailed to the recipients notified during the scoping period. Notice was also posted on public notice boards near the project area; two locations in Sawyers Bar, the project site, and Forks of Salmon.

A letter of inquiry from members of the public opposed to restoration actions on the Salmon River was submitted outside of the scoping period. Notice of the public comment period was mailed to individuals on the list whose names and addresses were legible.

On July 21, 2018, there was a public field trip to discuss the project and give additional opportunity for public comments and questions. Thirteen individuals attended the field trip, and one verbal public comment was given (see table below).

All comments received during the 30-day scoping period, ending July 28th, 2018 have been reviewed and summarized herein. A total of fourteen comments were received, including two comments received after the end of the legal comment period. Thirteen comments were supportive of the project and one comment was opposed to the project. Comment documents were tracked upon receipt to assure all comments were captured. The table below lists all commenters, when, and how comments were received.

Table 11. List of commenters who submitted comments.

Commenter	Receipt Date	Submission Method
Petey Brucker, community member	7/27/18	Project website
California Department of Fish and Wildlife (CDFW) - Neil Manji, Region 1 Regional Manager	7/27/18	Project website
Don Flickinger, member of the public	7/26/18	Project website
Karuk Tribe - Toz Soto, Department of Natural Resources Fisheries Program Manager/Lead Fisheries Biologist	7/26/18	Project website
Janice Keith, community member	7/25/18	Project website
Klamath Siskiyou Wildlands Center (KS Wild) - Kaitlin Loomis, Law Clerk	7/17/18	Email
Dean McBroom, nearby landowner	7/21/18	Verbal
Mid Klamath Watershed Council (MKWC) - Will Harling, Director	7/26/18	Project website
Rachel Neumann, community member	7/19/18	Project website
National Marine Fisheries Service (NMFS) - Bob Pagliuco, NOAA Arcata Restoration Center Marine Habitat Resource Specialist	7/17/18	Project website
Sierra Club - Felice Pace, North Group Redwood Chapter Water Chair	7/15/18	Project website
Quartz Valley Indian Reservation (QVIR) - Crystal Robinson, Environmental Director	7/25/18	Project website
Received after the legal comment period, but still considered:		
North Coast Regional Water Quality Control Board (NCRWQCB) - Jake Shannon, Nonpoint Source/401 Certification Unit Environmental Scientist	7/30/18	Project website
Klamath Forest Alliance and Environmental Protection Information Center (KFA/EPIC) - Kimberly Baker, KFA Executive Director and Thomas Wheeler, EPIC Executive Director	7/31/18	Project website and email

Comments received are summarized in the table below. The exact wording of the comments can be found in the project record.

Table 12. Summarized comments received.

Summarized Comment Type	Commenter
Commenter states general support of the project.	Petey Brucker; CDFW; Don Flickinger; Karuk Tribe; Janice Keith; KFA/EPIC; KS Wild; MKWC; NCRWQCB; NMFS; Rachel Neumann; Sierra Club; QVIR

Summarized Comment Type	Commenter
Comments on Specific Benefits of Project	
The project will improve winter rearing habitat for juvenile salmonids.	Petey Brucker; CDFW; Karuk Tribe; KFA/EPIC; KS Wild; MKWC; NCRWQCB; NMFS; QVIR
The project will improve summer rearing habitat for juvenile salmonids.	Petey Brucker; CDFW; Karuk Tribe; KFA/EPIC; KS Wild; MKWC; NCRWQCB; NMFS; QVIR
The project will improve floodplain function.	CDFW; Karuk Tribe; KFA/EPIC; KS Wild; MKWC
The project will benefit multiple species.	KFA/EPIC; KS Wild; MKWC; NCRWQCB; QVIR
The project will improve riparian vegetation.	Karuk Tribe; KFA/EPIC; KS Wild; MKWC
The project will improve salmonid spawning habitat.	KFA/EPIC; KS Wild; MKWC; QVIR
The project will improve temperature conditions.	Karuk Tribe; Sierra Club; KS Wild
The project will provide information for future river restoration projects.	Petey Brucker; Don Flickinger; MKWC
The Willow Pond feature is a promising site for summer and winter juvenile rearing habitat.	CDFW

Summarized Comment Type	Commenter
Comments on the Need for the Project	
The project meets NMFS SONCC Coho Recovery Plan Task Item SaIR.2.1.7 (NMFS 2014).	Petey Brucker; CDFW; KFA/EPIC; MKWC; NCRWQCB; NMFS; QVIR
The project meets Klamath Project BiOp Restoration Project Type 5 (NMFS and USFWS 2013).	Petey Brucker; KFA/EPIC; MKWC; Rachel Neumann; QVIR
The project meets the objectives of the Salmon River TMDL Implementation Plan (NCRWQCB 2005).	Petey Brucker; KFA/EPIC; KS Wild; MKWC; QVIR

Summarized Comment Type	Commenter
Comments on the Need for the Project	
The project meets CDFW Recovery Strategy for Coho Action SA-HA-09 (CDFG 2004).	Petey Brucker; KFA/EPIC; MKWC; QVIR
The project meets Northwest Forest Plan Aquatic Conservation Strategy Item 6-46 (Reeves et al. 2006).	Petey Brucker; KFA/EPIC; MKWC; QVIR
The project meets the objectives of the California Water Action Plan (CNRA et al., 2016).	Petey Brucker; KFA/EPIC; MKWC; QVIR
The project meets California State Coastal Conservancy Strategic Plan Objectives 6D and 6E (CCC 2017).	Petey Brucker; KFA/EPIC; MKWC; QVIR
The project meets the objectives of the California State Wildlife Action Plan (CDFW 2015).	Petey Brucker; KFA/EPIC; MKWC; QVIR
The project meets the objectives of the Salmon River Floodplain Habitat Enhancement and Mine Tailing Remediation Project Phase 1: Technical Analysis of Opportunities and Constraints and is identified as a high priority site segment, NF23b sta 64,850 (Stillwater 2018).	Petey Brucker; KFA/EPIC; MKWC
The project meets the California state planning priority AB 857 in the California @ 50 Million: The Environmental Goals and Policy Report (GOPR 2015).	Petey Brucker; KFA/EPIC
The project meets the NCRWQCB Policy in Support of Restoration in the North Coast Region (NCRWQCB 2015).	NCRWQCB

Summarized Comment Type	Commenter
Other Comments	
The project was peer reviewed and collaboratively designed by qualified specialists.	CDFW; Karuk Tribe; Janice Keith; KFA/EPIC; MKWC; QVIR
The project meets CDFW's California Salmonid Stream Habitat Restoration Manual standards (Flosi et al., 2010).	KFA/EPIC; MKWC; NCRWQCB; NMFS
The project includes extensive and long-term implementation monitoring, and adaptive management planning.	Petey Brucker; CDFW; KFA/EPIC; MKWC
The project will benefit spring-run Chinook which are culturally significant to the Karuk Tribe and other tribes throughout the Klamath Basin.	Petey Brucker; KFA/EPIC; MKWC
The project will benefit the last remaining viable run of wild spring-run Chinook in the Klamath Basin; which will likely play an important role in the restoration of spring-run Chinook in the upper Klamath Basin.	KFA/EPIC; MKWC
The project will provide work to local community members in a Severely Disadvantaged Community.	KFA/EPIC; MKWC
The project is Not Likely to Adversely Affect coho salmon.	NMFS
The project will have no effect on Northern Spotted Owl.	KS Wild

Summarized Comment Type	Commenter
Other Comments	
The project area is historically and culturally significant to the Karuk, Shasta, and Konomihu people, and there will be no detrimental effects to Native American Heritage Resources.	MKWC
Restoration should start at the top of the watershed and work down.	Sierra Club
Headwaters damaged by grazing should be restored, beginning with Long Gulch Creek.	Sierra Club

Summarized Comment Type	Commenter
Comment Opposed a Feature of the Project	
During the public field trip a comment was made regarding concerns about the effects to cold water refugia on the West Bar portion of the project area. The cold water entering the Salmon River at the location of the mid-bar channel alcove is an important source of cold water for fisheries refugia, which could be impacted by implementation of this project. The commenter stated that he is opposed to project activities on the West Bar portion of the project area.	Dean McBroom

Response to Comment Opposed to a Feature of the Project: The alcove and channel enhancement planned for West Bar is intended to improve the ability of fisheries to access and use the existing channels on West Bar. Currently, there is a very small, shallow alcove at the mouth of the mid-bar channel, which provides very limited space for fish to access the cooler water flowing into the river at that location in the summer. The channel and alcove currently provide limited slow-water refugia in the winter. The back-bar channel currently provides very limited slow-water habitat as well. Additionally, the lack of vegetation and woody debris in the mid-bar channel and alcove means there is very limited cover or food sources for juvenile fish. This project aims to enhance the West Bar channels so that the area is more accessible to fish as a cold water refugia in the summer and as slow-water refugia in the winter. The additions of wood and vegetation will provide cover for predators and food sources for juvenile fish.

Additionally, extensive restoration effectiveness monitoring would be conducted on West Bar. This would allow us to gain valuable insight into how specific features perform and provide refugia for fisheries. In the event that items of concern arise, consultation with the project team members, and other agencies, would occur in order to determine if a maintenance action is warranted.